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Abstract

The Analytical Country Reports analyse and assess in a structured manner the evolution of the national policy research and innovation in the perspective of the wider EU strategy and goals, with a particular focus on the performance of the national research and innovation (R&I) system, their broader policy mix and governance. The 2013 edition of the Country Reports highlight national policy and system developments occurring since late 2012 and assess, through dedicated sections:

national progress in addressing Research and Innovation system challenges;

national progress in addressing the 5 ERA priorities;

the progress at Member State level towards achieving the Innovation Union;

the status and relevant features of Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3);

as far relevant, country Specific Research and Innovation (R&I) Recommendations.

Detailed annexes in tabular form provide access to country information in a concise and synthetic manner.

The reports were originally produced in December 2013, focusing on policy developments occurring over the preceding twelve months.

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The Country Report 2013 builds on and updates the 2012 edition. The report identifies the structural challenges of the national research and innovation system and assesses the match between the national priorities and the structural challenges, highlighting the latest developments, their dynamics and impact in the overall national context.

The first draft of this report was produced in December 2013 and was focused on developments taking place in the previous twelve months. In particular, it has benefited from the contribution of Marja Nissinen from JRC-IPTS. The contributions and comments from DG-RTD and Rein Kaarli from Ministry of Education and Research, Estonia are also gratefully acknowledged.

The report is currently only published in electronic format and available on the [ERAWATCH website](#). Comments on this report are welcome and should be addressed to jrc-ipts-erawatch-helpdesk@ec.europa.eu.

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EXECUTIVE SUMMARY

The research and development and innovation (RD&I) system in Estonia was mainly set up in the beginning of 1990's when not only the legislation and institutions related to research and development (R&D) and innovation but the whole public functional system was created. Since 2000s', the basic principles of developing the R&D and innovation as well as policy and implementation system have remained the same in a broad sense. Recent studies¹ show that the policy mix has been set in the right direction and is successful in short term.

The overall level of R&D investments during the crisis in 2008-2009 showed a growth as a percentage of GDP (from 1.28% to 1.36%), but had a slight decline in absolute terms. The relatively stable financing was due to the previously committed Structural Funds, as R&D investments (GERD) dropped by only 5%, while GDP growth was -14%. In 2011 one could note a significant growth - 63% rise compared to 2010, mostly due to considerable R&D investments in shale oil refining industry. The share of government sector investments (GBOARD) as a percentage from GDP has been increasing for the last five years (from 0.64% in 2008 to 0.84% in 2012) (Eurostat, 2013).

Since 2000 Estonian R&D and innovation policy is financed from four main sources:

- targeted financing of research topics of evaluated R&D institutions, competitive institutional grant for research groups (16% of total Govt. funding in 2012)
- baseline funding of evaluated R&D institutions, based on R&D quality and outcome (5% of total Govt. funding in 2012)
- individual R&D grants, competitive (6% of Govt. funding in 2012)
- support towards maintenance of the R&D infrastructures (5% of Govt. funding in 2012)

Main challenges for policy makers to develop research, development and innovation (RD&I) are:

- Innovation system detached from vast part of the economy;
- Challenge to further develop RD&I system to make a difference in the economy & society at large;
- Upgrade the role of Estonian industry in the global value chains;
- Lack of trained personnel hinders growth and investments.

ERAC Peer-review (2012) points out that the size of Estonia sets on some limitations (the size of enterprises, the amount of financial and human capital available for RD&I), hence encouraging cross-sector co-operation (both in business and in government), identifying a smaller number of focus areas that are systematically developed and receive a significant proportion of both public and private R&D investments, helps to tackle these challenges. Recommendations of recent evaluation on innovation support measures carried out by the Ministry of Economic Affairs and Communications (2012) also involve reducing the volume of non-reimbursable grants, enhancing funding options; reducing the proportion of individual

¹ European Research Area Committee (ERAC) [Peer-Review of the Estonian Research and Innovation System](#) (2012); Ministry of Economic Affairs and Communication (MEAC): Estonia's enterprise and innovation policy's evaluation 2012 ([Ettevõtlus- ja innovatsioonipoliitika vahehindamine 2012](#), in Estonian) (2012); Ministry of Education and Research (MER): RD&I Strategy, [Report on achieving the objectives and implementing the strategy in 2010 and 2011](#) (2011)

grants and focusing more on supporting co-operation networks (clusters, co-operation between companies and universities etc).

R&D and innovation are among the key priorities of Estonian strategy for competitiveness “Estonia 2020” setting the objective of R&D investments in GDP on the level of 3% by 2020 (2.18% in 2012), of which the business sector investments would cover 2% of GDP by 2020 (BERD 1.25% of GDP in 2012) and public sector investments would cover 1% of GDP by 2020 (GBOARD 0.84% of GDP in 2012)

RD&I Strategy 2007-2013 focused on several national programme areas: three programmes have a technological focus (ICT, biotech and material technologies), four are focusing on societal challenges (energy, defence and security, health care and welfare services, environmental protection and technology) and there are also several programmes on Estonian culture, language, history and nature. In the new RD&I strategy for 2014-2020 (launched in January 2014), more effort is focused on Smart Specialisation and key R&D areas were chosen in cooperation with private enterprises (see ch. 2.7).

Summarising the conclusions of recent studies, the policy mix has been set on the right direction, being successful in the short term. According to working papers of the new RD&I strategy, in 2014-2020 the policy frame should remain the same, just focusing on R&D activities to respond to the needs of Estonian society and the economy, supporting the private sector R&D, motivating collaboration between government institutions, business and academia, and increasing the investments into tertiary education.

Estonia’s position in Innovation Union Scoreboard (2013) remained the same in 2011 compared to the previous year and is ranked as 14th (three places below the EU27 average). Estonia also maintained its position in innovation followers group.

The national policy mix is aligned with the ERA objectives as much effort is focused on developing research infrastructure² and improving mobility of doctoral students and researchers and promoting international co-operation³. To optimise research programmes and priorities in Estonia, RD&I Strategy 2007-2013 “[Knowledge-Based Estonia](#)” focused on seven key areas as mentioned above and the RD&I Strategy 2014-2020 focuses on three growth areas of Smart Specialisation (ICT supporting other sectors; health technologies and services; resource efficiency).

Access to scientific information is not a big problem for Estonian scientists as the [Consortium of Estonian Libraries Network](#) has created very good conditions and access to scientific journals and electronic databases for national researchers. Electronic identification and remotely accessible services are also widely available.

The only challenge seems to be gender issue. Estonian Government has not introduced specific gender quotas in support of gender equality either in the public or the private sector and excellence is still the main criterion for researchers to receive funding and to participate in decision-making bodies⁴. However, most of the indicators (She Figures 2012) show that situation in Estonia is better than in EU-27 on the average.

² MER (2010): [Estonian Research Infrastructures Roadmap 2010](#), including investment (ca €3m allocated in 2012) to the beamline at the MAX IV Laboratory in Lund (Sweden)

³ MER (2011): Programme for internationalisation of science (in Estonian, [Programm “Teaduse rahvusvahelistumine”](#))

⁴ EC (2013): [The Researchers Report 2012. Country Profile: Estonia](#)

Table of Contents

Executive Summary	2
1 Basic Characterisation of the Research and Innovation System.....	5
2 Recent developments of the research and innovation policy and system	8
2.1 <i>National economic and political context</i>	8
2.2 <i>Funding trends</i>	8
2.2.1 Funding flows	8
2.2.2 Funding mechanisms	10
2.2.3 Thematic versus generic funding	12
2.2.4 Innovation funding.....	12
2.3 <i>Research and innovation system changes</i>	12
2.4 <i>Recent Policy developments</i>	13
2.5 <i>National Reform Programme 2013</i>	14
2.6 <i>Recent evaluations, consultations, foresight exercises</i>	15
2.7 <i>Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)</i>	19
2.8 <i>Policy developments related to Council Country Specific Recommendations</i>	19
3 Performance of the National Research and Innovation system	21
3.1 <i>National Research and Innovation policy</i>	21
3.2 <i>Structural challenges of the national R&I system</i>	22
3.3 <i>Meeting structural challenges</i>	24
4 National progress in Innovation Union key policy actions	28
4.1 <i>Strengthening the knowledge base and reducing fragmentation</i>	28
4.2 <i>Getting good ideas to market</i>	31
4.3 <i>Working in partnership to address societal challenges</i>	33
4.4 <i>Maximising social and territorial cohesion</i>	33
4.5 <i>International Scientific Cooperation</i>	35
5 National progress toward realisation of ERA	36
5.1 <i>More effective national research systems</i>	36
5.2 <i>Optimal transnational co-operation and competition</i>	36
5.3 <i>An open labour market for researchers</i>	37
5.4 <i>Gender equality and gender mainstreaming in research</i>	38
5.5 <i>Optimal circulation, access to and transfer of scientific knowledge including via digital ERA</i>	39
Annex 1. Performance the national and regional research and innovation system	40
Annex 2. National Progress on Innovation Union commitments	43
Annex 3. National progress towards realisation of ERA.....	50
References	56
List of Abbreviations.....	60

1 BASIC CHARACTERISATION OF THE RESEARCH AND INNOVATION SYSTEM

Estonia is one of the smallest EU Member States accounting for ca 0.26% of the population of the EU-27. Gross Domestic Product (GDP) in 2013 was €18.4b (Eurostat, 2014). The national economy growth in 2000-2008 was rapid but went into a decline from 2008 onwards, when the real GDP growth rate was negative by -4.2% in 2008 and -14.1% in 2009 (Eurostat, 2014). The growth in 2010 was already 2.6%, 9.6% in 2011, but dropped back to 3.9% in 2012 (Eurostat, 2014) due to decline in external demand. The Government budget cuts in 2008 and 2009 allowed Estonian economy to recover quickly making Estonia one of the best-recovered European countries. Still, the average GDP per capita in purchasing power standard (PPS) remains below the EU-27 average – 71% in 2012, which leaves Estonia the recipient of full Cohesion Policy support. At the same time the real average EU-27 Gross Domestic Product (GDP) growth (3.2% in 2007; -0.4% in 2012) has almost always (except 2008-2009) remained less than Estonia's real GDP growth (7.5% in 2007; 3.9% in 2012).

Since 2000 Estonia has shown significant economic growth making it one of the fastest growing economies in the EU. Tight monetary and fiscal policy twinned with liberal economic policy has resulted in Gross Domestic Product (GDP) per capita growing from 37% of the EU average in 1996 to 71% in 2012 (Eurostat, 2014). Besides tight fiscal and monetary policy Estonia's main advantages have also been high quality educational system (PISA⁵ ranking significantly above OECD average) and flexibility to adopt to economic changes⁶. Estonia has become an innovation follower having gross expenditure on R&D (GERD) increased from 1.1% from GDP in 2007 up to 2.37% in 2011 (Eurostat, 2014). Due to a steady growth since 2004, government budget appropriations or outlays on R&D (GBAORD) amounted to 2.12% of the total Government expenditures budget in 2012 (EU-27 1.42%).

The innovation governance system has remained basically intact. The present system is uncomplicated with rather clear division of responsibilities and a firm connection with the political leadership (see Figure 1). RD&I strategic objectives and principles of management and financing are set in the [RD&I strategy for 2014-2020 "Knowledge Based Estonia 2014-2020"](#) (launched in January 2014). Also [Estonian Research Infrastructures Roadmap 2010](#) will be updated in 2014. The "Entrepreneurship Growth Strategy 2014-2020" (in Estonian "[Eesti ettevõtluse kasvustrateegia 2014-2020](#)") which focuses on co-operation between enterprises and R&D institutions, was launched in October 2013.

The main priorities for R&D and innovation policies set down in the RD&I Strategy have been followed. The RD&I Strategy is supplemented by annually updated implementation plan that provides a predictable policy framework for short- and medium-term planning, via annual implementation plans, investment plans, etc⁷. A new implementation plan for [RD&I strategy for "Knowledge Based Estonia 2014-2020"](#) will be drawn up in early 2014.

⁵ PISA – OECD [Programme for International Student Assessment](#)

⁶ OECD, [Economic Survey of Estonia 2012](#)

⁷ [ERAC Peer-Review](#) of the Estonian Research and Innovation System: Steady Progress Towards Knowledge Society (2012)

Policy design and evaluation is carried out, mainly, by the [Ministry of Economic Affairs and Communications](#) (MEAC) and the [Ministry of Education and Research](#) (MER). However, all ministries are responsible for the organisation, evaluation and financing of the required R&D in their areas of government; drafting R&D programmes (national and in their own areas of government) and organising their implementation; approval of the statutes of state research and development institutions which belong under their area of government. MER and MEAC as leading ministries have also additional responsibilities. MEAC organises technological development and innovation policy, supervises support for and funding of applied research, development and innovation as well as planning, coordination and organisation of international cooperation in the field. MER is responsible for the implementation of the national research and education policy, the financing and evaluation of research institutes and libraries, organisin national competitions in the research field and coordination of international cooperation in research.

Two permanent **advisory bodies** (the Research Policy Committee and the Research Competence Council) provide advice to the Ministry Education and Research and the Innovation Policy Committee advises the Ministry of Economic Affairs and Communications. The [Research and Development Council](#) (R&D Council) is an expert consultative body that advises the Government on R&D and innovation matters – all policy documents on the way for approval by the Government have to pass the R&D Council.

An innovation oriented projects promoter is [Development Fund](#), a public law entity, founded by the Estonian Parliament in April 2007. The aim of the Development Fund is to initiate and support changes in the Estonian economy and society that would accelerate modernisation of Estonian economic structure, lead to growth in exports and contribute to the creation of new jobs requiring high qualifications. For that purpose, the Development Fund (together with the private sector) performs risk capital investments into the starting and growth-oriented technology companies and carries out socio-economic and technology foresight exercises.

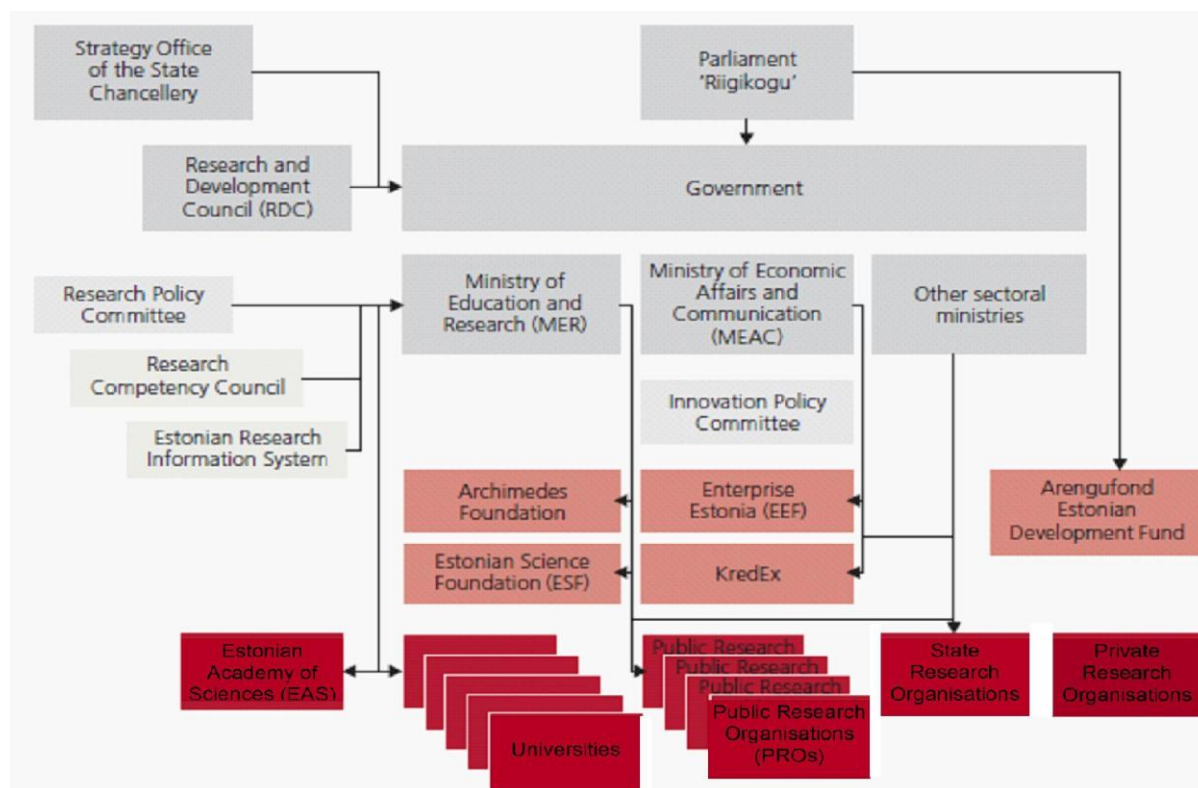
At the operational level, both ministries have implementing agencies/bodies and intermediaries. The main implementing body of the Ministry of Economic Affairs and Communication is the [Enterprise Estonia Foundation](#), which is responsible for managing business support, innovation and technology programmes. Foundation [KredEx](#)'s mission is to facilitate the increase of competitive strength of Estonian companies by improving the availability of financing and managing credit risks, and the improvement of the energy efficiency in the housing sector by expanding financing possibilities and offering financing solutions aimed at promoting energy efficiency.

From the research policy perspective, the Ministry of Education and Research has two main agencies that deliver funding and support: the [Archimedes Foundation](#) is responsible for national activities related to the European Research Area (ERA), international research programmes, academic mobility measures, etc. In addition, the [Estonian Research Council](#) (since 1 March 2012) aims to reorganise the financing system, primarily to reduce the fragmentation of financing, and improve the efficiency of the research institutions and to provide grant funding to scientific researchers. In March 2011, the Parliament adopted the new Research and Development Organisation Act, which provides changes in the public funding system.

The [INNOVE](#) foundation manages a range of programmes and support measures in the fields of lifelong learning and active labour market policies.

The only ministry having sectoral RD&I Strategy (Strategy for Agricultural Research 2007-2013) and corresponding budget (€10.9m) is the [Ministry of Agriculture](#).

Figure 1: Innovation policy governance framework



Source: ERAC Peer-Review of the Estonian Research and Innovation System, 2012

2 RECENT DEVELOPMENTS OF THE RESEARCH AND INNOVATION POLICY AND SYSTEM

2.1 National economic and political context

The national economy growth in 2000-2008 was rapid but went into a decline from 2008 onwards, when the real Gross Domestic Product (GDP) growth rate was negative by -4.2% in 2008 and further negative -14.1% in 2009 (Eurostat, 2013). The growth was restored in 2010 (2.6%), was 9.6% in 2011 due to increased exports, but slid back to 3.9% in 2012 as foreign demand fell. The Government budget cuts in 2008 and 2009 allowed Estonian economy to recover quickly making Estonia one of the best-recovered European countries. Still, the average GDP per capita in PPS remains under the EU-27 average – 71% in 2012, which leaves Estonia the recipient of full Cohesion policy support. Except for 2008-2009, Estonian real GDP growth has almost always been above the real average EU-27 GDP growth (respectively 3.9% and -0.4% in 2012).

Estonian strategic objectives for R&D, innovation and enterprise policy have been relatively stable over the last decade (at least since 2004). The structural weakness of the national economy remains, with a relatively lower share of high technology and knowledge-intensive companies. The input of shale oil refining industry helped to double total intramural R&D expenditure (GERD) in 2011 (in absolute terms) and GERD intensity reached 2.37% in 2011 (Eurostat, 2013). GERD intensity and its structure may have been affected by the recent crisis but the real impact has not been crucial for R&D development.

2.2 Funding trends

2.2.1 Funding flows

RD&I strategic objectives are set in the RD&I Strategy “Knowledge-based Estonia” (new strategy for 2014-2020 launched in January 2014). The target towards total R&D investments (GERD) in 2020 is set on 3% of GDP and business sector R&D investments (BERD) on 2% of GDP.

The overall level of R&D investments as a percentage of GDP almost doubled in 2008-2011 (from 1.28% to 2.38), but slid back to 2.18 on 2012. The business sector investment (BERD) as a percentage of GDP follows the same trend: tripled in 2008-2011 and slid back on 2012. The share of government sector investments (GBOARD) as a percentage from GDP has been growing steadily for last five years (from 0.64% to 0.84%) (Eurostat, 2013). In 2011, payments from the Structural Funds targeted at R&D increased from €18.3m to €54.2m (296%), direct foreign investments from €26.6m to €46.6m (75%)⁸.

Gross expenditure on R&D (GERD) in absolute terms has tripled in 2004-2010 and doubled in 2010-2011. As a percentage of GDP it is now above the EU average. During the crisis in 2008-2009, R&D investments showed increase as a percentage of GDP but had slight decline in

⁸ [Report on achieving the objectives and implementing the strategy in 2012](#) (MER, 2013)

absolute terms. The relatively stable financing was due to the previously committed Structural Funds (GERD dropped by only 5%, while GDP growth was -14%). In 2011 one could note a significant growth, mostly due to big R&D investments in shale oil refining industry.

In the business enterprise sector, investments dropped by 1,9% during the crisis, but doubled in 2011 compared to 2010, and in 2011 Business Expenditures on Research and Development (BERD) results in 1.5% of GDP. Unfortunately, the effect was not sustainable, as building of a new shale oil refinery caused most of the rise in BERD. In 2012, BERD declined to 1.25% of GDP and Estonia is again below the EU-27 average.

GBAORD as % of GDP is with 0.84% above the EU average (0.67% in 2012) and as a share of general government expenditure reached 2.12% in 2012 (EU-27 1.42%). Higher education sector performed 32.2% of GERD in 2012 (EU27 23.78%). From 2008 to 2011 the share of HEIs declined from 43% to 28%, but turned back to 32% in 2012, as business sector investments declined.

Table 1. Basic indicators for R&D investments in Estonia

	2009	2010	2011	2012	EU28 (2012)
GDP growth rate	-14.1	2.6	9.6	3.9	-0.4
GERD (% of GDP)	1.41	1.62	2.37	2.18	2.06
GERD (euro per capita)	147.3	173.7	187.7	284.9	525.8
GBAORD - Total R&D appropriations (€ million)	95.45	102.49	125.55	144.97	86,309.497/ 3082.5 (2012)
R&D funded by Business Enterprise Sector (% of GDP)	0.54	0.71	1.3	1.12	1.12 (2011)
R&D performed by HEIs (% of GERD)	42.16	38.0	27.8	32.2	23.78
R&D performed by Government Sector (% of GERD)	10.99	10.55	8.1	9.3	12.39
R&D performed by Business Enterprise Sector (% of GERD)	44.69	50.16	63.17	57.45	62.96
Share of competitive vs. institutional public funding for R&D*	69 vs. 31	69 vs. 31	69 vs. 31	n/a	n/a
Venture Capital as % of GDP	n/a	n/a	n/a	n/a	0.025 (EU-15)
Employment in high- and medium-high-technology manufacturing sectors as share of total employment	4.1	3.5	4.4	4.2	5.6 (2011)
Employment in knowledge-intensive service sectors as share of total employment	34.9	35.2	34.4	35.0	38.9 (2011)

	2004	2006	2008	EU27 (2008)
Turnover from Innovation as % of total turnover	11.9	13.7	10.2	13.3

Data Source: EUROSTAT, December 2013

* Data Source: ERAC Peer-Review of the Estonian Research and Innovation System, 2012

While the national R&D budget has been almost the same from 2008-2012 (except for slight decrease in 2009), the share of EU Structural funds has been growing remarkably. In 2011 and 2012, 64% of all public sector RD&I funding was financed by Structural Funds (includes co-

funding from the state)⁹. As the funding from the structural funds has been specifically targeted for infrastructure development, mobility schemes and internationalisation, the possibilities to use it for other general needs, such as researchers' salaries, maintenance costs and indirect costs was limited¹⁰. While the previous strategy focused primarily on developing Estonia's capability in research and development and innovation, the new RD&I Strategy for 2014-2020 (launched in January 2014) aims to use the created potential, create good framework conditions for development and focus on increasing the social and economic effects of RD&I.

2.2.2 Funding mechanisms

2.2.2.1 Competitive vs. institutional public funding

The main RD&I funders are MER and MEAC. MER is responsible for the funding of R&D (including applied and basic research) at R&D institutions and MEAC for funding applied research, technology development and innovation. According to ERAC Peer Review (ERAC, 2012), the main R&D funding instruments in MER budget (70 %) and most of the funding from MEAC budget are competitive. The share of competitive versus institutional funding in the R&D national budget of MER was 69% and 31% respectively in 2011¹¹. Most of the R&D funding from the budget of the Ministry of Economic Affairs and Communication (12% of total R&D budget in 2012) is provided on competitive basis and MEAC funding instruments include very high share from EU Structural funds¹². The amount of funding of R&D through other ministries is small (5% in 2012). Overall, four largest RD&I funding instruments envelop ca 40% of total public funding in 2011. In absolute numbers, government funding increased from €104m in 2008 to €145m in 2012.

The main RD&I policy instruments in MER are:

- targeted financing of research topics of evaluated R&D institutions, competitive institutional grant for research groups, success rate ca 70% (24% of total Govt. funding in 2008; 16% in 2012);
- baseline funding of evaluated R&D institutions, based on R&D quality and outcome (8% of total Govt. funding in 2008; 5% in 2012);
- individual R&D grants, competitive, success rate varies from 70–50% and is dependent of the funding available for new grants (9% of Govt. funding in 2008; 6% in 2012);
- support towards maintenance of the R&D infrastructures (7% of Govt. funding in 2008; 5% in 2012).

This share of financing as of categories of policies as well as financing sources has been remained the same since 2007 when the 2007-2013 financing framework was approved within the state budget strategy by the Government.

Since 2001 the public support given to develop the innovation policy has been mainly given as grants. The size of the grant varies according to the measure conditions and legal status of the

⁹ Ministry of Finance (2011) [State budget 2012](#)

¹⁰ [ERAC Peer-Review](#) of the Estonian Research and Innovation System: Steady Progress Towards Knowledge Society (2012)

¹¹ [ERAC Peer-Review](#) of the Estonian Research and Innovation System: Steady Progress Towards Knowledge Society (2012)

¹² [ERAC Peer-Review](#) of the Estonian Research and Innovation System: Steady Progress Towards Knowledge Society (2012)

applicant. Almost in all cases the grants are a subject of the European state aid rules, mainly de minimis or block exemption.

Annual baseline funding is allocated on the basis of R&D performance of R&D institutions (regular evaluation of realization of strategic goals, co-financing foreign and domestic projects and opening up new research directions)¹³; the same applies to the support to maintenance cost of R&D infrastructures.

2.2.2.2 Government direct vs indirect R&D funding

Government support to private sector R&D is mainly direct funding via competitive grants. No tax incentives have been given to the R&D and innovation investments except that the companies' income is free of tax to the extent that they reinvest their profit. There are no instructions whether the reinvestment has to be made in R&D and innovation or anywhere else, the only criteria are for the investments to be made into the development of the company. The tax policy of the Government of Estonia follows the rule of taxing everything similarly and allowing as few exemptions as possible – consequently, the idea of specific tax incentives for R&D and innovation expenditures has not been supported by the Government so far.

MEAC supervises support for and funding of business sector R&D and is responsible for funding applied research, technology development and innovation. The main implementing body of MEAC is the Enterprise Estonia Foundation, which is responsible for managing business support, innovation and technology programmes. Foundation KredEx's mission is to facilitate the increase of competitive strength of Estonian companies by improving the availability of financing and managing credit risks, and the improvement of the energy efficiency of the housing sector by expanding financing possibilities and offering financing solutions aimed at promoting energy efficiency.

An innovation oriented projects promoter is Development Fund, a public law entity, founded by the Estonian Parliament in 2007. Development Fund (together with the private sector) performs risk capital investments into the starting and growth-oriented technology companies and carries out socio-economic and technology foresight exercises. Development Fund started investments in June 2008 and till 2013, 16 investments have been made in the total amount of 7 million euros. Based on State Budget Act 2011, €12.5m were allocated to the fund for investment activities and €6.4m in 2012.

The [Baltic Innovation Fund](#) (BIF) is a Fund-of-Fund initiative launched by the EIF in close co-operation with the Governments of Lithuania, Latvia and Estonia in 2012 to boost equity investments made into Baltic Small and Medium sized enterprises (SMEs) with high growth potential. BIF represents a €40m investment by EIF with each Baltic Government committing €20m through their respective national agencies (INVEGA in Lithuania, [KredEx](#) in Estonia and LGA in Latvia).

BIF will invest €100m into private equity and venture capital funds focusing on the Baltic States over the next four years through a 'fund of funds' process to attract additional private finance and implement the best market standards for equity investing in businesses.

¹³ The baseline funding is allocated as follows: 50% in proportion with the number of high level publications in internationally recognised journals, the number of high level research monographs and the number of registered patents and patent applications; 40% in proportion with the amount of financing of research and development from other sources i.e. targeted research, commissioned by enterprises, municipalities, ministries etc; 10% in proportion with the number of Doctoral graduates. Source: Conditions and Procedure for Base-line Funding of Research and Development Institutions (in Estonian "[Teadus- ja arendusasutuste baasfinantseerimise määramise tingimused ja kord](#)")

2.2.3 Thematic versus generic funding

To optimise research programmes and priorities in Estonia, RD&I Strategy for 2007-2013 focuses on seven key areas: three programmes have a technological focus (ICT, biotech and material technologies), four are *focusing on societal challenges* (energy, defence and security, health care and welfare services, environmental protection and technology). By the end of 2011, six national programmes (ICT, biotechnology, energy, national defence and security, environmental protection and technology, health promotion research programme) have been launched. Based on the feasibility study¹⁴, full-scale programme in materials technology was not launched, but an open call was announced as a provisional programme. According to the “Report on achieving the objectives and implementing the strategy in 2012”, the total budget for all programmes is about €51m¹⁵.

National programmes have been launched primarily for developing RD&I enhancing cooperation among R&D institutions and companies; and conducting high-level research in the fields that are a priority for the state. Programme measures have to support the achievement of thirteen specific indicators (e.g. increasing share of R&D employment, growing number of PhD students and PhDs, growing number of foreign researchers and students, improving science-industry cooperation, increasing business R&D and innovation investments, growing productivity, etc.).

2.2.4 Innovation funding

As the line for differentiation between research and innovation is not very clear and the term “innovation”, for which a number of different interpretations exist, has not been defined in the guidelines of this report, it is difficult to provide precise data. No specific data summarizing innovation funding from various sources is currently collected in Estonia.

In general, MER is responsible for research area and MEAC is responsible for innovation, but there is no rule that funding from the MER budget could not be used for innovation or vice versa. In fact, innovative approaches as such are rather encouraged in the selection criteria of some support measures. In 2013, the share of MER in the total R&D budget (€169m in absolute terms) was 80% (83% in 2012) and the share of MEAC was 14% (12% in 2012).

Examples of innovation-oriented support measures provided via Enterprise Estonia include R&D grants, Innovation Voucher grant and Involvement of innovation (see more in ch.4.2). In addition, venture capital investments could be counted as innovation funding. In 2011, €12.5m and in 2012 €6.4m were allocated to the Estonian Development Fund for investment activities. In 2013, the Government allocated €20m to Baltic Innovation Fund (BIF) to boost equity investments made into Baltic Small and Medium sized enterprises (SMEs) with high growth potential.

2.3 Research and innovation system changes

In January 2014, the Parliament approved new [RD&I strategy for 2014-2020 "Knowledge Based Estonia 2014-2020"](#), which is Estonia's third strategy on research and development and innovation. While the previous strategies focused primarily on developing Estonia's capability in

¹⁴ [Feasibility Study for an Estonian Material Technology Programme](#), 2011

¹⁵ Budget is given for programme period (most of programmes implemented 2012-2015). Annual data not available.

research and development and innovation, the new strategy aims to use the created potential for the good of Estonia's development and economic growth. In the setting of priorities the methodology of smart specialization will serve as basis. The strategy identifies four key goals:

- Research in Estonia is of a high level and diverse;
- Research and development (RD) functions in the interests of the Estonia's society and economy;
- RD improves the knowledge-intensity of the structure of the economy;
- Estonia is active and visible in international RD&I cooperation.

In October 2013, the Government approved the [Entrepreneurship growth strategy for 2014-2020](#). The general goal of the strategy is to facilitate the achievement of the objectives within the national competitiveness plan "Estonia 2020" to enhance productivity and employment. Main goals of the strategy are:

- Development of co-operation networks between enterprises and R&D institutions (including international co-operation);
- Development of demand-side policies (innovative public procurements etc);
- Fostering start-up entrepreneurship.

In April 2013, [Estonian Information Technology Foundation for Education](#) (HITSA)¹⁶ was established. The mission of HITSA is to provide a high-quality national network infrastructure for Estonia's research, educational and cultural communities. HITSA administrates the Estonian IT Academy programme, the Estonian higher educational information and communications technology and research and development activities programme (ICT programme), and ICT area higher education support and development programme Tiger University. Its services include a permanent Internet connection as well as webhosting, e-mail, consultations in the event of security problems etc.

In March 2012, Estonian Research Council (ESC), a new funding agency for Estonian's research was established, which took over the functions of the Estonian Science Foundation and some functions of the Archimedes Foundation¹⁷. The aim of this reorganisation of functions of the ESC is to gather all R&D and research financing instruments 'under one roof' in order to create better synergy and avoid duplication and overlap (incl. in financing). The ESC is performing under the jurisdiction of the Ministry of Education and Research.

2.4 Recent Policy developments

At the end of 2011 the Minister of Education and Research launched a reform of higher education and some amendments to the law were made and new Universities Act adopted in 2012 with the aim to rearrange the financing of higher education, strengthen the quality and effectiveness as well as to increase more fair accessibility of higher education. Recent changes in the Research and Development Organisational Act, reorganisation of Estonian Science Foundation into Estonian Research Council, and the launched reform in higher education system are the tools to achieve the strategic objectives.

¹⁶ From May 1st 2013, the Tiger Leap Foundation and the Estonian Education and Research Network were transferred to the Estonian Information Technology Foundation and the new name of established organisation is Information Technology Foundation for Education (HITSA; www.hitsa.ee)

¹⁷ Research Cooperation Centre, a department of the Archimedes Foundation, acting as a FP7 National Contact Point was transferred from Archimedes Foundation to the Estonian Research Council.

In 2012, amendments were made to the [Organisation of Research and Development Act](#), to offer Ph.D. students an employment contract with the same social guarantees as any other employment. This will contribute to improving attractiveness of doctoral studies.

In 2013, amendments were made to the [Aliens Act](#) (adopted in 1993, new version in 2009, last amendments in 2013), in order to change current procedures for giving work permits with the objective of making it easier for potential top-level specialists and highly qualified employees to enter Estonia's labour market.

In "Estonia 2020" (adopted in 2011 and updated annually) the specific R&D and innovation objectives were updated and specified in the light of the recent economic developments (the target of reaching 3% of R&D costs in GDP was postponed to 2020 instead of the initial 2013). This is on the one hand in accordance with the strategy "European Union 2020" but on the other hand also reflecting the changed economic possibilities.

The main priorities for R&D and innovation policies were set down in the "Knowledge-based Estonia 2007-2013" (adopted in 2007) and these priorities have been followed.

[The Estonian Research Council](#) (founded in 2012) awards [institutional](#) and [personal research funding](#) (relevant amendments to the [Organisation of Research and Development Act](#) in force since 2012). Grant competitions are open to all permanent residents of the Republic of Estonia and to all citizens of a foreign country, if they have full-time job in Estonian R&D institution (residency is not required). Grants should be applied for through an Estonian R&D institution.

2.5 National Reform Programme 2013

National Reform Programme "Estonia 2020" describes the main challenges and relevant policy measures that fall into four areas:

- educated population and cohesive society: the quality and availability of education and labour force supply;
- competitive business environment: policy that supports the improvement of the long-term competitiveness of businesses, creative industries, international competitiveness of research and development and business-supporting infrastructure;
- environmentally friendly economy and energy: resource efficiency, including energy efficiency;
- sustainable and adaptive state: sustainability of public finances, ability to react to changing circumstances and imbalances, tax policy supporting the development of the economy and modernisation of the government sector.

In 2012, Estonia assumed twelve reform obligations under the Euro Plus Pact and two of them have impact on RD&I activities: reform of the management system of the EU funds and simplification of the system of entrepreneurship grants. These obligations will be implemented in 2013 as follows:

Modernisation of public administration involves the reform of management and support systems of European Union funds. The main purpose of the reform of the management systems is to better pool functions and tasks and to reduce the number of management levels. In addition, a single Operational Programme was developed for a more effective and efficient management of resources of the Cohesion Policy funds.

To **promote economic growth and competitiveness**, the process of simplifying and better targeting of entrepreneurship grants has been carried out. The renewal of the system of grants

and a broader use of financial instruments has been of priority during the planning process for the use of funds of the EU 2014–2020 financing period.

The measures applied for the purpose of complying with the **country-specific recommendations** (relevant to RD&I) fall under the “Tailoring of education to labour market requirements” as described below.

The development of the **RD&I strategy for 2014-2020**, as well as the **Entrepreneurship growth strategy 2014-2020** focusing on business sector, began in 2012. During this preparatory work, main focuses were set for the coming years in order to develop R&D, innovation and entrepreneurship policies. The core of both strategies are the areas of growth selected on the basis of the methodology of smart specialisation, where global demand is combined with Estonia's strengths both in the areas of entrepreneurship and research. Joint R&D infrastructure and research projects between different countries are also of importance. All this would enable Estonia to integrate more efficiently with the international research area.

The objective of the **higher education funding reform** or shift to performance agreements is to raise the quality of higher education, reduce unreasonable duplication and promote cooperation between different institutions of higher education. As a result of the reform the share of state funding will increase which is a prerequisite for ensuring access to free higher education. The central idea of the funding reform is to make funding directly dependent on the quality and effectiveness of education, taking into account the society's needs.

For allocation of activity support to institutions of higher education, contracts under public law and performance agreements were concluded with them. Over the next three years the focus will be on actual implementation of the agreements, which significantly contributes to internationalisation of higher education, improving the quality of doctoral studies, reduction of the number of students who discontinue their education, teaching entrepreneurship skills and cooperation with companies.

2.6 Recent evaluations, consultations, foresight exercises

Following are studies related to research and innovation policies that provide international analysis of strengths and weaknesses at national and regional level and of emerging opportunities ('smart specialisation') and market developments, carried out in 2012-2013.

1) The Estonian Development Fund completed two surveys on Smart Specialisation (see also ch 2.7 and 5.2):

- [Qualitative Analysis of Smart Specialisation](#) (2012)
- Smart Specialisation: [Analysis of deficiencies and new opportunities](#) (2013)

2) [Comparative analysis of Estonian research funding](#) (deliverables of the Research and Innovation Policy Monitoring Programme - TIPS Programme, 2013)

The report aimed to identify and elaborate the ways for addressing challenges in Estonian research and development (R&D) funding and draws on the examples of other small countries (Luxembourg, Slovenia, Finland, Iceland, Malta, Cyprus and Latvia). The report suggests that the share of project-based funding measures is in current setting too high in Estonia (also in international comparison). One possible solution would be re-designing the policy measures that are granted on a competitive basis (project-funding), but in reality are considered to work as institutional ones for sustaining and balancing the research groups in different broader science fields.

The funding levels of R&D activities in Estonia are low in EU-comparison, but also not sustainable in the longer term, because about 60% of the funding is relying on EU Structural Funds. The R&D expenditure per researcher FTE constitute only a third of EU average.

It is also found that private sector performance has been weaker in R&D and this is one of the reasons why the research system is considered to have low level of local relevance. Here the idea of smart specialisation is currently seen as a way out focusing on the growth areas with higher value added (by means of university-industry collaboration projects, but also infrastructure investments). The measures similar to centres of excellence or networks could also be successfully used for achieving better coordination in some rather scattered research fields.

By analysing sectoral distribution of public funding for encouraging Estonian business R&D, clearly the strategy of supporting existing strong performers is evident (the analysis is based on empirical data reflecting sectoral specialization in public and private R&D funding). Some areas important with respect to the local resources or market opportunities should be targeted instead for achieving better economic outcomes.

In the processes of internationalisation of research, Estonia seems to be well integrated in EU cooperation networks if judged by international co-publication analysis. Further cooperation of local research groups with internationally strong research institutions should be encouraged in all fields, but for better responding to socioeconomic challenges of the country, targeted contracts between different countries for specific cooperation activities are needed in addition to the EU frameworks.

3) [Interim evaluation of the cluster programme](#) (MEAC, 2013, in Estonian).

The objective of the interim evaluation of the cluster programme is to estimate the impact of the programme on the organisations operating in the clusters and gather feedback from the entrepreneurs on the activities of the cluster. The central topic is the question of how much the development of clusters has influenced the competitiveness of the enterprises, how much have the results of these enterprises improved due to the cluster programme and what is the evaluation of cluster members for the team managing the cluster.

In general, both the cluster managers and enterprise managers gave a positive evaluation to the cluster strategy. Of the enterprises in the cluster, 65% would not make any changes to the cluster strategy. According to an enterprise that was not satisfied with the cluster strategy, the strategy should include more clearly measurable objectives and an action plan framework, a sharper focus, and could involve more enterprises as well as research and education institutions.

Interviews with the cluster managers revealed that one of the greatest values and assets for an enterprise participating in the cluster programme are the cooperation opportunities it creates. Cooperation with research institutions is viewed very differently among both cluster managers and enterprises within the clusters. In most cases the cooperation is sporadic in its nature, with cooperation that is broader in scope and steadier having been initiated in very few cases. About half of the cluster enterprises find that cooperation with universities through the clusters has contributed to the development of the organisation, and that such cooperation is expected to increase further in the future.

As cooperation with research institutions progresses slowly and is time-consuming, an increase in cooperation may not be attainable through the development of the clusters, but rather with a combination of other measures in the field of innovation.

4) [Global monitoring and satellite navigation - applications, usage and impact on Estonia](#) (Invent Baltics & Regio, 2013, in Estonian).

Invent Baltics OÜ and Regio AS conducted the analyses from February to August 2013 as requested by Enterprise Estonia. The study analyses thoroughly the EU space programmes

Copernicus, Galileo and EGNOS and gives overview of the implementation of these programmes with regards to the new possibilities to Estonia's enterprises, state institutions and people. The report has assembled useful information for entrepreneurs, policy makers, officials of public institutions, the researchers of the field and also to all users of applications of space technologies.

The objective of the study was to:

- give economical, statistical and technical overview of the volumes of different space applications, state of art and trends in Estonia at present and in the near future;
- give overview of possibilities of applications of programmes Galileo, EGNOS and Copernicus in Estonia and assess their impact to the economy;
- assess the size of impact on Estonian economy by implementing the activities specified in the Strategy for Estonian Space Affairs 2011-2013

5) [ERAC Peer-Review of the Estonian Research and Innovation System: Steady Progress Towards Knowledge Society](#) (2012)

Estonian research policies have been driven by a steady development based on quality, excellence and competition. The development of innovation policy and the Estonian innovation system has been inspired by what is done in the Nordic region and in other European countries. This has worked well so far, but in the longer run it will not be sufficient.

The challenge for Estonia is arguably to further develop its research and innovation system in ways that will make a difference for the economy at large without in the process dismantling the solid innovation assets created that will matter more in the medium- to long-term than they do now. There are, of course, many other aspects in which the Estonian innovation system can be improved. But the overall impact of any reforms on the Estonian innovation system will to a large degree depend on whether it can do more of the things that are right for Estonia's economy as it looks like today, not just doing things that are generally viewed as important aspects of an innovation system.

6) [The Role of Green ICT in Enabling Smart Growth in Estonia](#) (Ernst&Young, 2012)

Ernst & Young Baltic AS carried out a study "The role of green ICT in enabling smart growth in Estonia" on a request from the Estonian Ministry of Economic Affairs and Communications. The purpose of the study was to give information about the current state and growth potential of green ICT in Estonia, also its development and application from the perspective of public and private sector.

Global trends analysis revealed that a rapid uptake of greening with ICT (reducing environmental impact of processes, products, services with ICT) as an enabler of smart growth could be assumed although currently policy making and business actions still focus on greening of ICT (reducing environmental impact of ICT). So far not much practical policy actions have taken place regarding green ICT as enabler of smart growth.

The study showed that Estonian companies are rather innovative and quite frequently innovate in order to make their products, services or business processes more efficient and environment friendly. Nevertheless, it was revealed that there are four obstacles that constrain wider and more pervasive development and adoption of green ICT in Estonia: low awareness, uncertainty concerning advantages, constrained cooperation, and scarcity of financial resources.

7) [Mid-term evaluation of innovation and enterprise support policies](#) (MEAC, Enterprise Estonia, 2012, in Estonian)

In the second half of 2011 and first half of 2012, the Ministry of Economic Affairs and Communications carried out in cooperation with the Enterprise Estonia and KredEx in-house

evaluation of the Estonian enterprise and innovation policy. The purpose of Estonia's enterprise and innovation policy's evaluation is to assess the measures used and the impact, effectiveness and sensibleness of those measures. The policy measures subject to the evaluation are implemented by two government agencies: Enterprise Estonia and KredEx.

The central topic of the evaluation was the question to what extent the measures of Enterprise Estonia and KredEx have helped in overcoming market failures. In quantitative analysis the six economic indicators were examined – sales revenue, labour costs, number of employees, export, profit and value-added per employee.

Conclusion by grant and service types of Enterprise Estonia are following:

- The economic indicators of the companies that received **start-up company grant** (it includes start-up and growth grants), adjusted by the reference group, showed better results in five out of six indicators. The growth has been faster in the number of employees, sales revenue, export revenue, labour costs and value-added per employee. The sales revenue of start-up grant recipients grew on average 30% in comparison with the reference group.
- The receivers of the **export plan program grant** had better results in five out of six indicators when adjusted with the reference group. The only indicator that was better for the reference group was profit.
- Four out of six economic indicators have moved in a positive direction for the companies that received **knowledge and skills grant** when compared to the reference group. In the dynamics of the number of employees, sales revenue, profit and export revenue they have been more successful than the reference group.
- According to the adjusted results of the **technology investment grant** recipients four out of six indicators are positive. There is faster growth in export revenue, sales revenue, labour costs and value-added per employee indicators' dynamics than in the reference group.
- The dynamics of the economic indicators of the **research and development (R&D) grant** recipients have outperformed the reference group in five out of six cases. The changes in the number of employees, labour costs, sales revenue, export revenue and value-added per employee have been positive. The indicator of profit was negative.
- With the recipients of the **tourism grant** only semi-structured interviews were conducted. All of the companies who were interviewed thought the influence of Enterprise Estonia on the development of tourism was important.

Conclusions by service types of KredEx are following:

All of the indicators grew faster than the Estonian average for the **start-up loan** service. For the **loan guarantee** service the growth was faster for export, sales revenue, number of employees, labour cost and profit, but not for value-added. For **export guarantee** the growth was faster for 4 of the indicators, but not for value-added and labour cost. The growth was faster for three of the indicators for the **credit line** and **subordinated loans**. For the **subordinated loans**, the growth of export, labour cost and sales revenue was below the Estonian average. For the **credit line** the growth of the number of employees, labour cost and export was below the Estonian average.

Based purely on this analysis it cannot be concluded which product group has had the best effect. The aims of the product groups are all different and thus the expected results are also different. To better understand the effect of the services on the companies, a survey and semi-structured interviews were also conducted. Recipients' assessment (on a 1-7 scale) was higher for the **start-up loan guarantee** varying to 4–5. For the **loan guarantee** the assessment was somewhat lower for profitability (3.4) and revenue (3.3), but a bit higher for export revenue (4.2). According to the judgement of the **loan guarantee** recipients 39% of the jobs created were

created thanks to the services of KredEx. Amongst the **start-up loan guarantee** and **subordinated loan** recipients the judgements were 75% and 25% respectively.

2.7 Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)

To date, there is no separate national or regional R&I strategy on Smart Specialisation and there is no plan to have one, as Smart Specialisation is incorporated in the RD&I Strategy 2014-2020 and in the Entrepreneurship Growth Strategy 2014-2020. The budget for Smart Specialisation in 2014-2020 is planned to be about €140m (including structural fund co-financing).

At the end of 2012, the Estonian Development Fund completed the first phase ([Qualitative Analysis of Smart Specialisation](#)) and the areas of Smart Specialisation were selected. In June 2013, the work on a follow-up was completed ([Analysis of deficiencies and new opportunities](#)) and specific bottlenecks were found that need to be dealt with in order to increase innovation. The second part of analysis focused on practical recommendations and actions to overcome the obstacles in Estonian innovation. These analyses were commissioned by the Ministry of Economic Affairs and Communications and the Ministry of Education and Research.

The growth areas were selected, using OECD/EC Smart Specialisation methodology. The analysis was made in cooperation with Enterprise Estonia, Estonian Research Council and leading economists.

Smart Specialisation **growth areas** are:

- ICT supporting other sectors (use of ICT in industry incl. automation and robotics, cyber security, software development)
- Health technologies and services (biotechnology, e-health)
- Resource efficiency (material science and industry, knowledge-based construction, health promoting food industry, chemical industry).

2.8 Policy developments related to Council Country Specific Recommendations

EC country specific recommendation on R&D is to “intensify efforts to prioritise and internationalise the research and innovation systems and enhance cooperation between businesses, higher education and research institutions”¹⁸.

Estonia is taking steps to link training and education more effectively to the needs of the labour market, and enhance cooperation between businesses and academia and foster prioritisation and internationalisation of the research and innovation systems. Estonia also participates actively in EU RD&I programmes and European Research Area initiatives and launched programme for internationalisation of science already before the recommendations. Also national R&D programmes have been launched in recent years on health promotion research, environmental protection and technology, ICT and material technology, where internationalisation and cooperation with business sector are priorities.

The new RD&I Strategy for 2014-2020 (launched in January 2014) was prepared in co-operation with research institutions, entrepreneurs and the public sector. The new RD&I Strategy is

¹⁸ [Council Recommendation on Estonia's 2013 national reform programme and delivering a Council opinion on Estonia's stability programme for 2012-2017](#); Brussels, 29.5.2013

coherent with the National Reform Programme, “Estonia 2020” strategy and Entrepreneurship Growth Strategy 2020. In the setting of priorities the methodology of Smart Specialisation served as basis. Smart Specialisation growth areas (see ch 2.7) will be supported comprehensively by different policies and strategies and specific support programmes.

Estonia’s research aims to be of high quality and versatile and an attractive place for R&D and the aim is that the career of a researcher be a popular choice. Research and development activities should serve the interests of Estonia’s society and economy and Estonia aims to be active and visible in international cooperation in the field of R&D and innovation. Development of support programmes for research, development and growth companies will be based on smart specialisation, new measures focussing on a limited number of growth areas under preferential development that were selected on the basis of economic and social impact.

3 PERFORMANCE OF THE NATIONAL RESEARCH AND INNOVATION SYSTEM

3.1 National Research and Innovation policy

Government appropriations or outlays on R&D (GBAORD) amounted to 0.84% of GDP in 2012 (EU-28 0.67%) and have increased remarkably also in absolute terms (from €95m in 2009 to €145m in 2012). GBAORD as a share of general government expenditure was 1.62% in 2008, but reached 2.12% in 2012 (EU-27 1.42%). Stable financing has supported the capacity of public higher education institutions (HEI) to provide also qualified graduates and future personnel in engineering, science and technology.

Estonia is small, compared to EU other countries, and this reflects on the size of infrastructure and funding opportunities. Under EU programming period 2007-2013 funding, research infrastructure is being developed quite extensively. Out of 11 R&D facilities of the R&D and higher education infrastructure investment plan adopted by the Government of the Republic, 3 facilities have been completed and paid for, 6 are almost complete and also partially in use, only 2 are still under construction. In general, present activities concerning infrastructure investments have been sufficient to cover the insufficient investments from the previous periods. In the future, the main focus has to be on ensuring the sustainability of infrastructure.

Trends for patenting and for scientific publications are positive. The number of international scientific co-publications per million of population increased from 501 in 2009 to 734 in 2012 and patents applications per million of population increased from 25 in 2008 to 44 in 2011 (MER, 2013). The main reason for relatively low number of patents is related to the less favourable structure of economy and industry, high costs of patenting and its complexity and legal uncertainty (MER, 2011).

Based on 'Thomson Reuters Web of Science' number of publications per full-time researcher, Estonia is on the average position compared to some other EU member states, ahead of Hungary, Finland, Lithuania and Latvia, and falling behind Ireland, Slovenia, and Sweden. In comparison with last year, Estonia's respective indicator has improved (0.39 versus 0.35 publications per researcher) (MER, 2013).

Estonia's position in Innovation Union Scoreboard (2013) remained the same in 2011 compared to previous year and is ranked as 14th (three places below the EU27 average). Estonia also maintained the position in innovation followers group.

Estonia's biggest strengths compared to other EU countries are the private sector expenditures (2nd position; primarily concerning innovation expenditures not related to research and development), and the share of the public sector R&D (6th position).

The biggest problem is economic impact of innovation, where Estonia holds 23rd position. Considering the criterion of open, excellent and attractive research system, Estonia holds 17th position as well as with human resources criterion. Therefore, the main challenges for Estonia are creating research and development and business environment necessary for increasing export intensity and employment in medium and high-tech industry and knowledge-intensive services.

Table 2. Innovation Union Indicators

HUMAN RESOURCES	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	0.9 (2010)
Percentage population aged 25-64 having completed tertiary education	40.3(2011)
Open, excellent and attractive research systems	
International scientific co-publications per million population	734.2 (2011)
Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	7.45 (2008)
Finance and support	
R&D expenditure in the public sector as % of GDP	0.84 (2012)
FIRM ACTIVITIES	
R&D expenditure in the business sector as % of GDP	1.12 (2012)
Venture capital and seed capital as % of GDP	n/a
Linkages & entrepreneurship	
Public-private co-publications per million population	25.0 (2011)
Intellectual assets	
PCT patents applications per billion GDP (in PPS€)	2.35 (2009)
PCT patents applications in societal challenges per billion GDP (in PPS€) (climate change mitigation; health)	0.56 (2009)
OUTPUTS	
Economic effects	
Medium and high-tech product exports as % total product exports	43.0 (2010)
Knowledge-intensive services exports as % total service exports	37.4 (2010)
License and patent revenues from abroad as % of GDP	0.1 (2011)

Sources: Eurostat 2013; IU Scoreboard Report (2013)

3.2 Structural challenges of the national R&I system

ERAC Peer-Review of Estonian R&D system (2012) marks that Estonian research policies have been driven by a steady development based on quality, excellence and competition. The *main*

challenge for Estonia is to further develop its research and innovation system in ways that will make a difference for the economy at large without in the process dismantling the solid innovation assets created that will matter more in the medium- to long-term than they do now.

ERAC Peer-Review points to the challenges and suggests focusing more on R&D as a means to achieve economic and societal goals, link better with Estonia 2020 strategy, strengthen co-ordination and cooperation, focus on fewer key areas, and harness RD&I measures to drive structural change in the economy.

According to the peer-review, the main **challenges of the R&D system are as follows:**

1. Innovation system detached from the vast part of the economy and, as a consequence, delivers relatively little value for the average Estonian

This is the result of the innovation system being focused on areas other than those that dominate the Estonian economy today; it is not a simple failure to commercialise scientific activity. These observations also raise the question whether the past efforts to build an innovation system have properly addressed the indigenous structural features of the Estonia's economy. The policy has aimed to develop a science-driven system in order to create innovation. It succeeds at that to a large degree, but is still incapable of supporting the upgrading of the existing Estonia's existing economy. Suggestion is to invest more strongly in creating public-private partnerships in innovation and to broaden the scope of policy to include instruments that support upgrading traditionally strong industries.

2. Challenge to further develop RD&I system to make a difference in the economy & society at large

Estonian RD&I policy has so far been rather detached from the practical needs of the industry. Partially this has been due to the lack of absorptive capacity of the industry. However, in future the RD&I policy should more strongly contribute to the upgrading of the low-tech and low added-value industries, and thereby drive the much needed structural change in the economy. The support instruments and the performance of RD&I should be developed and measured against their anticipated impact on the society, such as changes in economic structures, employment, health or education-base.

3. Upgrade the role of Estonian industry in the global value chains

To raise the productivity and value added of the economy, efforts must be made to upgrade the role of Estonia's industry in the global value chains by means of stimulating RD&I, with the emphasis on the D and I. Innovation should not be understood narrowly as technology and new product development, but also as process and manufacturing development, training, IPR development, organisational innovation and service development that all contribute to productivity and value creation.

4. Lack of trained personnel hinders growth and investments

Lack of trained personnel hinders both domestic growth as companies need to start growing outside Estonia early on as the resources in home country are exhausted easily, and lack of resources also acts as a disincentive for foreign investment, negating the effect of favourable industry conditions. In short, a lack of educated and skilled labour is a major underlying constraint for growth of productivity and value creation in Estonia's economy, that should be addressed through policy coordination on multiple fronts, including education, particularly adult and secondary/vocational education beside tertiary education, as well as labour and immigration policy supporting RD&I policy.

3.3 Meeting structural challenges

One programming period is over and new measures are being developed for 2014-2020. The RD&I Strategy for 2007-2013 focused on the development of knowledge and technology transfer, modernisation of infrastructure and technology, internationalisation of research (incl. researchers' mobility) and business, supporting start-up companies and developing cooperation between business and academia.

ERAC Peer-review (2012) points on the following **aspects concerning the governance and funding** of research and innovation in Estonia¹⁹:

1) The growth of RD&I investments has been impressive, but questions remain as to whether the current trajectory is sustainable. While BERD has been growing steadily, an increasing share of RD&I expenditure is financed through public sources, namely from European Structural Funds. In 2011 and 2012, 64% of all public sector RD&I funding was financed by Structural Funds. Further, all the loans and guarantees that KredEx passes for business development and RD&I are funded from EURDF or EUSF. As national funding has not increased as much as expected and as was agreed in the strategy (as a consequence of economic recession), the share of EU Structural Funds in the general R&D budget has increased significantly in recent years. As the funding from the Structural Funds is specifically targeted for infrastructure development, mobility schemes and internationalisation, the possibilities to use it for other general needs, such as researchers' salaries, maintenance costs and indirect costs are limited. Much of the growth in RD&I funding this far is explained by filling in the gap in infrastructure investment. To improve sustainability of RD&I funding, better focus and balance between Human Capital and infrastructure investment are needed, as well as thinking and planning devoted to avoiding a dependency on EU Structural Funds.

2) Innovation policy seems high on the Estonian policy agenda and RD&I policy is systematically planned, however there is a need for more active RD&I policy coordination. RD&I policy making is in general restricted to MER and MEAC and coordination between the ministries has been insufficient. Apart from the MER and MEAC other ministries are not permanently represented in the Research and Development Council, the Research Policy Committee²⁰ or the Innovation Policy Committee. It appears that the Research and Development Council has not sufficiently followed up its work as clear results of the advice given by the council are hard to identify and attribute.

The connection between sector ministries, societal stakeholders and the core RD&I system is insufficient. Also, the participation and activity of other stakeholders and societal partners (entrepreneurs, civil society organisations) in advisory bodies is low and thereby limits the capability of advisory bodies and stakeholders to define the social demand for RD&I policy. That is probably one of the reasons why it is difficult to design RD&I policies oriented towards addressing major societal challenges as the "owners" of these challenges are not involved sufficiently or they cannot define the social demand for R&D policy clearly enough.

3) The implementation of research and innovation policies is fragmented and therefore multiple foundations and agencies implement policies through partly overlapping funding instruments, which poses a hurdle for applicants. At least partly overlapping or complementary instruments are offered by e.g. Enterprise Estonia and KredEx. Currently same industrial RD&I projects are

¹⁹ Other recent studies have made similar conclusions (MEAC, 2012: Estonia's enterprise and innovation policy's evaluation 2012; National Audit Office, 2012: Activities of the state in promoting key areas of research and development; MER, 2013: Report on achieving the objectives and implementing the strategy in 2012)

²⁰ From March 2012, the Ministry of Finances, Ministry of Social Affairs and Ministry of Agriculture are represented in Research Policy Committee

<https://www.riigiteataja.ee/akt/313032012001>

funded from different sources as separate projects during the life time of the idea to market. This results in large project administration overheads and reduced impact of funding. Different grant award criteria and gaps between the instruments leads to funding discontinuities. Instruments have funded plans/activities rather than delivery. Coordination of international cooperation is weak. Although a lean public sector is an aim by itself, the shortage of resources in a small country may become a challenge in solving problems that need stronger public intervention and coordination, e.g. setting up and implementing cross-sector instruments. Handling systemic/cross cutting issues is hindered because of a lack of resources and insufficient coordination processes between the ministries, e.g. launching sector/thematic programmes has proved to be challenging.

4) There is a need to strengthen ownership and implementation of national RD&I programmes. Currently there is lack of clear ‘ownership’ for the national RD&I programmes, which makes their implementation challenging. Sector ministries have not been sufficiently engaged in objective setting and administration of RD&I programmes. E.g. the Health RD&I programme is run currently outside the Ministry of Social Affairs although MSA would have the best expertise in the substance area. Furthermore, there is lack of strategic RD&I programmes. Ownership of the objectives is outside the research system, and objectives do not engage all the players.

5) There is a need to put more focus on increasing the impact from RD&I investments. There is lack of knowledge on the impact of RD&I funding. There are relatively few evaluations for RD&I programmes and instruments, and even the few are executed by the ministries themselves. Better monitoring of the progress and assessment of impact of programmes and other RD&I support measures is needed. The establishment of the Estonian Research Council in 2012 and its monitoring and evaluation responsibilities is a welcome introduction to this end.

The knowledge-intensive private sector is very narrowly-based and needs specific measures. There are around 400 companies actively conducting R&D in Estonia and around 10% of them account for most of the RD&I investments. Future of RD&I policy needs to address how to support the best 10% and at the same time, attract and help the rest 90% of domestic companies to get engaged with research and development work in order to move up in the value chain and to gain competitiveness.

While RD&I Strategy for 2007-2013 concentrated on capacity building, the **new strategy for 2014-2020** concentrates on making social and economic effects of capacities.

To respond to challenges listed in ch. 3.2, the RD&I Strategy for 2014-2020 aims to²¹:

1. **Focus specifically on exiting large-scale support schemes**, including analysing possibilities for replacing current direct support actions gradually with financing instruments.
2. **Set clearer focus on national RD&I programmes** – national RD&I programmes are one of the main instruments in implementing strategic priorities, therefore, national programmes need to be clearly connected with strategic priorities – reduce their number and make implementation more efficient.
3. **Focus on limited number of growth areas**, on the basis of the Smart Specialisation concept. These fields need to be given priority in coordinated development using research and development and innovation as well as enterprise policy measures in cooperation with sectoral ministries;

²¹ MER 2013: Report on achieving the objectives and implementing the strategy in 2012

4. **Ensure competent human resources** – limited human resource is one of the main obstacles in developing the Estonian economy and society. Therefore, opportunities need to be found for better involvement of the people we have, increasing their competences, as well as bringing in additional competences from abroad.
5. **Enhance connectivity of RD&I system internally as well as externally** – one of the objectives of the new strategy is enhancing national as well as international cooperation of Estonian R&D institutions and enterprises. In order for Estonia to benefit from the results of joint initiatives and have better perspectives to implement these results for prosperity of our economy and society, there has to be better interconnection with European Research Area initiatives (including joint programming initiatives, European Innovation Partnerships, Baltic and Nordic cooperation), possibilities ensured for Estonian participation in pan-European R&D infrastructures.

Table 3: Assessment of the policy mix

Challenges	Policy measures/actions	Assessment in terms of appropriateness, efficiency and effectiveness
<p>1. Innovation system detached from vast part of the economy</p> <p>AND</p> <p>2. Challenge to further develop RD&I system to make a difference in the economy & society at large</p> <p>AND</p> <p>3. Upgrade the role of Estonia's industry in the global value chains</p>	<p><i>1) Focus has been on co-operation between businesses and R&D institutions</i></p> <p>Programme "Start-up Estonia" for new innovative enterprises</p> <p>Business incubators;</p> <p>Competence Centre grants;</p> <p>Cluster development;</p> <p>Centres of Excellence.</p> <p><i>2) Focus has been on developing products and services:</i></p> <p>R&D grants;</p> <p>Product development;</p> <p>Innovation vouchers;</p> <p>Venture capital investments.</p> <p><i>3) Focus has been on modernisation of infrastructure and equipment:</i></p> <p>Modernisation of R&D equipment;</p> <p>R&D institutions infrastructure;</p> <p>Investments into test- and semi-industrial laboratories;</p> <p>Technology investments of industrial enterprises.</p>	<p>The measures have been under implementation since 2008/2009. The measures have generally been appropriate and successful, as economic indicators (number of employees, labour costs, value-added per employee, sales revenue, profit, export revenue) have moved in a positive direction for the companies that received support (as compared to the reference group)²².</p> <p>The funds have all been committed by today and the size of the measures was increased in 2009, as the demand was higher than expected.</p> <p>Positive developments have been made for financing by venture capital. In addition to the seed-funds of Estonian Development Fund (in place since 2008), Estonian government started funding the Baltic Innovation Fund (in 2013), committing €20m through respective national agency KredEx. In 2012, Estonian Business Angels Network (EstBAN) was founded.</p> <p>No changes in legislation have been made. RD&I Strategy for 2014-2020 tackles it (launched in January 2014)</p>

²² MEAC (2012): [Estonia's enterprise and innovation policy's evaluation 2012](#) (in Estonian)

Challenges	Policy measures/actions	Assessment in terms of appropriateness, efficiency and effectiveness
4. Lack of trained personnel hinders growth and investments	<p>Collaboration of HEIs;</p> <p>PhD studies and internationalisation;</p> <p>Researchers mobility;</p> <p>Involvement of innovation staff;</p> <p>Development of knowledge and skills grants;</p> <p>Science popularisation programmes and awards (focusing mainly on youth).</p>	<p>The measures have been under implementation since 2008/2009. The measures have generally been appropriate and successful, as RD&I Strategy target levels will probably be achieved regarding the share of researchers and engineers, patents; and the anticipated number of publications has already been exceeded²³. The involvement of innovation staff has to be reshaped, as there is no need for such a support on the market – instead of foreign innovation staff maybe hiring of local researchers could rather be supported.</p> <p>The support measures for researchers are open for all areas – prioritising the science and technology (S&T) could be an option for increasing the number of researchers S&T. For increasing impact and accessibility, the size of the measures should be increased in the future depending on the availability of funding.</p> <p>No changes in legislation have been made. RD&I Strategy 2014-2020 tackles it (launched in January 2014)</p>
5. Focus on fewer key areas	<p><i>National programmes on key areas:</i></p> <p>Energy technology programme;</p> <p>Biotechnology programme, ICT programme;</p> <p>Space programme;</p> <p>Provisional programme on materials technology;</p> <p>Environmental protection and technology programme;</p> <p>Health promotion research programme.</p>	<p>Only two programmes (energy & biotechnology) were launched before 2011, so it is too early to assess effectiveness properly.</p> <p>Recent evaluations of R&D system (ERAC Peer-Review 2012, MEAC 2012, Audit Office 2012) all suggest focusing on fewer key areas. The growth areas defined in the RD&I Strategy 2014-2020 would provide a basis for it.</p>

Sources: Ruuta Ruttas-Küttim's compilations on the basis of evaluations by MEAC (2012), National Audit Office (2012) and ERAC Peer-Review (2012)

²³ Report of the National Audit Office (2012): [Activities of the state in promoting key areas of research and development](#)

4 NATIONAL PROGRESS IN INNOVATION UNION KEY POLICY ACTIONS

4.1 Strengthening the knowledge base and reducing fragmentation

Promoting excellence in education and skills development

In 2011, the level of researchers per thousand of total employment (7.4) was higher than the EU-27 average (7.03), but is lower than the EU-27 average per thousand of labour force (5.9 and 6.6 respectively). The share of researchers in labour force increased in 2009 and remained almost the same in 2010 (7.45 and 7.4 per 1000 respectively), which is very close to the target of 8 researchers per thousand. Unfortunately this is not a result of carefully planned action, but happened mostly due to the big fall in total employment²⁴.

There is no austerity measures aimed at research. After budget cuts in 2009, the government decided to increase investments into research and development even faster, than had previously been planned in the RD&I Strategy.

Researchers in Estonia still do not have competitive salaries compared to other European countries (average earnings in Estonia are in general three times smaller than those of EU-27²⁵). In order to tackle this problem, all State budget financing means related to researchers' salaries were increased by 30% in the 2008 budget. However, the 2009 economic downturn has led to initial salary cut-backs in the research sector²⁶. After 6% fall in 2009, the monthly wages for professional, scientific and technical activities have risen by almost 25% within 3 years (8% in 2010, 5% in 2011 and 10% in 2012; Statistics Estonia, 2013).

Another obstacle to researcher mobility has been difficulties to obtain Estonian visa / residence permit from countries where Estonia does not have a representation.

Estonian research institutions not being sufficiently broadly known and unattractive conditions have proved to be bigger obstacles than expected in bringing foreign top researchers and Doctoral students to Estonia by using human capital development measures²⁷.

The number of foreign Doctoral and BA students coming to Estonia has increased during the last years. In 2011/2012, most foreign students came to Estonia from Finland (45.1%), Russia (8.1%), Latvia (6.5%) and China (4.8%). The share of foreign Doctoral students studying at Estonian universities has also increased from 5.8% in the academic year 2010/11 to 7.2% in 2012/2013²⁸. The share of foreign university teachers was 5.1% in the academic year 2010/11 and the share of foreign full-time researchers was 6.7% of all researchers²⁹.

The system for open, transparent and merit based recruitment of researchers has been in place since the beginning of the 2000s. Universities and R&D Institutions are quite autonomous in their

²⁴ RD&I Strategy, Report on achieving the objectives and implementing the strategy in 2012; OECD Database, 2013

²⁵ Eurostat: Annual net earnings (2011). Estonia – 6.663 EUR; EU27 – 19.843 EUR

²⁶ Technopolis Group (2011): A study in support of the ERA Framework Impact Assessment on gathering an overview and analysis on the way research and research systems are regulated in the EU Member States

²⁷ [Implementation Plan for achieving the objectives of Estonian Research and Development and Innovation Strategy 2007-2013 “Knowledge-based Estonia” in 2012-2013](#)

²⁸ Data web page of MER and ETIS <http://www.haridussilm.ee/>

²⁹ Report on achieving the objectives and implementing the strategy in 2012 (in Estonian, [Aruanne strateegia eesmärkide ja rakendusplani täitmisest 2012. aastal](#))

recruitment policies, but basic rules are set in [Organisation of Research and Development Act](#) and detailed conditions and procedures are established by the ministry or corresponding body of the legal person which governs a R&D institution. Relevant regulations are “The conditions of and procedure for the election of academy research professors” (introduced in 2002, in Estonian “[Uuriija-professori valimise tingimused ja kord](#)”) and “The conditions of and procedure for organising a competition for research staff in a research and development institution under the area of government of the Ministry of Research and Education” (introduced in 2001, latest amendments in 2012, in Estonian “[Haridus- ja Teadusministeeriumi valitsemisalasse kuuluvate riigi teadus- ja arendusasutuste korraliste teadustöötajate konkursi läbiviimise tingimused ja kord](#)”). Similar conditions also apply to R&D institutions that are under governance of other ministries.

In 2012, amendments were made to the [Organisation of Research and Development Act](#), to offer Ph.D. students an employment contract with the same social guarantees as any other employment. This will contribute to higher attractiveness of doctoral studies.

In 2013, amendments were made to the [Aliens Act](#) (adopted in 1993, new version in 2009, last amendments in 2013), in order to amend the current procedures for giving work permits with the objective of making it easier for potential top-level specialists and highly qualified employees to enter the Estonian labour market.

The Estonian Research Council (founded in 2012) awards institutional and personal research funding (relevant amendments to the Organisation of Research and Development Act in force since 2012), which will replace Estonian Science Foundation research and targeted funding of research topics in allocated by MEC according to the resolution made by Science Competence Council. Grant competitions are open to all permanent residents of the Republic of Estonia and to all citizens of a foreign country, if they have full-time job in Estonian R&D institution (residency is not required). Grants should be applied for through an Estonian R&D institution.

Through the researcher mobility programme Mobilitas postdoctoral researchers and top researchers have a possibility to apply for a grant to carry out a research in Estonia or abroad.

The predecessor of the Estonian Research Council - Estonian Science Foundation - has adhered to the EUROHORCs Money Follows Researcher Letter of Intent and has agreed to finance research carried out in foreign institutes after it has been initiated in an Estonian R&D institution. Grant holders can apply to transfer their research grants only if the institution of the host country has also signed up to the Letter of Intent.

[EURAXESS Estonia](#) provides information and assistance to researchers (PhD students, postdoctoral scholars, researchers, and other academic staff) wishing to come to Estonia or for those looking for jobs in research abroad. EURAXESS Estonia has Service Centres in 7 biggest Estonian R&D institutions and helps researchers and their families to plan and organise their move to a foreign country and provides advice in all matters related to academic mobility. Information on jobs, entry conditions, taxation, transfer of social security and pension contributions, finding accommodation and administrative assistance is available. All public universities hosting EURAXESS Services Centres have signed the “[Agreement on Good Practice](#)” which supports the internationalisation of Estonia’s Higher Education Institutions.

Programme for Co-operation and Innovation between Higher Education Establishments (introduced in 2009, last update in 2012, in Estonian “[Kõrgkoolide koostöö ja innovatsiooni arendamine](#)“, period 2009-2015) has three submeasures (doctoral schools; co-operation between higher education establishments and enterprises; innovation in higher education establishments). The programme is targeting on research excellence, interdisciplinary research options, exposure to industry and other relevant employment sectors, international networking, transferable skills training and quality assurance.

Doctoral study programmes usually include training in transferable skills to improve researchers' employment skills and competencies (based on the [Standard of Higher Education](#); introduced in 2008, last amendments in 2012). Doctoral schools, curricula development activities, lectures, seminars, practical training classes, laboratory work and individual classes can be developed by each institution with the aim of acquiring knowledge and achieving better learning outcomes for participants.

The Rectors' Conference, representing all public universities in Estonia and one private university, signed a "Quality Agreement of Estonian Universities" (signed in 2011, in Estonian "[Eesti Ülikoolide Kvaliteedi hea tava lepe](#)") which specifies quality standards for doctoral studies and encourages interdisciplinary studies and research and also refers to the implementation of the 'Charter & Code'. Estonia supports the principles of the charter, but does not support mandatory use of the charter as this would increase administrative burden.³⁰

Universities and other R&D institutions are relatively independent on forming their HR policies. Only evaluation mechanisms for assessing researchers' professional performance are in some way regulated by [Organisation of Research and Development Act](#) (introduced in 1997, last update in 2012) and the [Universities Act](#) (introduced in 1995, last update in 2012), as teaching and research positions in R&D institutions are subject to public competition and the selection process also involves evaluation of professional performance.

Research Infrastructures

The [Estonian Research Infrastructures Roadmap 2010](#) (introduced in 2010, update planned to be launched in 2014³¹) is a long-term (10-20 years perspective) planning instrument, which lists research infrastructure units of national importance which are either new or in need of modernizing. The roadmap is updated regularly (at an interval of 3 years) to take into account the changing circumstances and opportunities. Allocation of funds for developing infrastructure is described in the [Implementation Plan for achieving the objectives of Estonian Research and Development and Innovation Strategy 2007-2013 "Knowledge-based Estonia" in 2012-2013](#).

According to the [Estonian Research Infrastructures Roadmap 2010](#), Estonia will participate in the following ESFRI projects: Common Language Resources and Technology Infrastructure (CLARIN); European Social Survey; Biobanking and Biomolecular Resources Research Infrastructure (BBMRI); An Integrated Structural Biology Infrastructure for Europe (INSTRUCT); European Spallation Source.

While updating Infrastructure Roadmap in 2013, Estonia has quite comprehensive consultations with Finland, as Finland is also updating their Research Infrastructure Roadmap. Swedish experts will be also involved in the process of selection of infrastructure objects for the next Roadmap.

Estonia has no directly applicable national legislation targeting the cross-border access to research infrastructure. [Estonian Research Infrastructures Roadmap 2010](#) itemises national interest in specific ESFRI projects, but does not deal with rules on access to facilities. Indirectly, mobility programmes provide access also to the infrastructure.

The interest of foreign researchers and R&D institutions for using Estonian RI has not been high, as the quality of the infrastructure was not good. The development of Estonian R&D

³⁰ Estonian position for the development of the „Horizon 2020“ http://www.etag.ee/wp-content/uploads/2012/05/seletuskiri_Horizont2020.pdf

³¹ [Action Plans of Ministries for 2013](#) (in Estonian)

infrastructure is in progress and the quality is increasing every year. Estonia is small, compared to EU other countries, and this reflects on the size of infrastructure and funding opportunities³².

4.2 Getting good ideas to market

Improving access to finance

[RD&I Strategy 2007-2013 “Knowledge-Based Estonia”](#) and [Estonian Strategy for Competitiveness “Estonia 2020”](#) (launched in 2010) give the framework for enhancing co-operation between private and public sector.

The “Entrepreneurship Growth Strategy 2020” (launched in October 2013, in Estonian “[Eesti ettevõtluse kasvustrateegia 2020](#)”) is targeting issues of “tailored support” to meet the needs of companies, particularly SMEs, and keeping the bureaucracy to a minimum.

A number of measures to facilitate the partnerships and productive interactions between research institutions and the private sector have been under implementation since 2008-2009. Counselling on measures is provided also in [county development centres](#).

The following measures are funded by MEAC and implemented by [Enterprise Estonia Foundation](#):

- [Business Incubation Programme](#)
- [Competence Centre Programme](#)
- [Cluster development](#)
- R&D grants (in Estonian, [Teadus- ja arendustegevuste projektide toetus](#))
- [Innovation Voucher grant](#)
- Investments into test- and semi-industrial laboratories (in Estonian “[Katse- ja pooltööstuslikud laborid](#)”)
- Involvement of innovation staff (in Estonian “[Arendustöötaja kaasamise toetus](#)”)
- [Development Grants to Manufacturing Companies](#)
- [Knowledge and technology transfer baseline funding](#) (SPINNO Programme)
- Prototyping Centre grants (in Estonian, [Prototüüpimiskeskuste toetus](#))
- Programme “Start-up Estonia” (in Estonian “[Programm “Start-up Estonia”](#)”) for new innovative enterprises

Public-private venture capital investments through the [Estonian Development Fund](#) have given significant impulses for high-growth internationally oriented start-ups in Estonia.

In Estonia, 99.9% of enterprises are SMEs and all start-ups are small, so most of support measures are targeting SMEs; up to date, measures do not differentiate between SMEs and other enterprises.

Support is mainly given via open calls and should be applied through an Estonian enterprise or R&D institution. Allocating of competitive funds involves an international peer evaluation of the proposals³³ and selection criteria are straightforward.

As most of the support measures depend on Structural Funds co-financing, rules of Structural Funds are followed. Entrepreneurs find that the bureaucracy is quite big and some demands, as “taking pictures with EU flag in every step,” are a bit ridiculous³⁴.

³² MER, 2013: Report on achieving the objectives and implementing the strategy in 2012 (in Estonian, [Aruanne strateegia eesmärkide ja rakendusplaani täitmisest 2012. aastal](#))

³³ERAC [Peer-Review of the Estonian Research and Innovation System](#) (2012)

Protect and enhance the value of intellectual property and boosting creativity

Estonia views its intellectual property rights (IPRs) regime as a component of an articulated national strategy on innovation, and has substantially improved its quality of enforcement over recent years. Compliance related activities in Estonia are closely interlinked with those of the European Union and the EU's relationship with the WTO. Estonia has a system of intellectual property rights that is well developed from a legal perspective. Significant amendments and modifications have been made in recent years to bring the Estonian system closer to the international norms of developed economies, particularly during the process of adapting or amending national legislation to become a member of the European Union.³⁵

In January 2013, a new institution was started – the [Estonian Intellectual Property and Technology Transfer Centre](#), which took over the activities of the Estonian Patent Information Centre. The Estonian Intellectual Property and Technology Transfer Centre (EIPTTC) is a foundation established by the Estonian Chamber of Commerce and Ministry of Economic Affairs and Communication. EIPTTC offers a wide variety of intellectual property and technology transfer support services, training and education. EIPTTC stock and online search possibilities guarantee the possibility of carrying out examination to novelty and state of art of the applications for registering the subjects of legal protection of industrial property by the Estonian Patent Office as well as for research purposes.

EIPTTC contains a public library. The library's basic functions are collecting, storing and making available for public the stock of the domestic and foreign documents in the area of protection of the industrial property.

Issues of competitiveness in R&D activities are regulated by the "General permission (block exemption³⁶) to enter into a R&D agreements which restricts or may restrict competition" (adopted in 2011, in Estonian "[Konkurentsi kahjustavate või kahjustada võivate teadus- ja arenduskokkulepete sõlmimiseks loa andmine \(grupierand\)](#)").

Public procurement

Up to the date, no national target has been introduced on public procurement of innovative goods and services. Government Office of Estonia commissioned a qualitative survey "[Mapping the public procurement field in order to aid innovative and sustainable public procurements and joint procurements](#)" in 2012, which shows that public tenders do not include clear innovation criteria. Also no quantitative data is available on public tenders launched for joint public procurement of innovation. Updates of national procurement policy will be addressed in the "Entrepreneurship Growth Strategy 2014-2020" (launched in October 2013).

Estonia is also in the process of [renewing its patent and intellectual property rights system](#). The Ministry of Justice established an Expert Group on the Codification of the Intellectual Property Law. The whole intellectual property system will be thoroughly examined. Updated

³⁴ Mid-term evaluation of innovation and enterprise support policies (in Estonian, "[Ettevõtlus- ja innovatsioonipoliitika vahehindamine](#)"; MEAC 2012)

³⁵ OECD (2011), Enhancing market openness, intellectual property rights, and compliance through regulatory reform in Estonia

³⁶ A block exemption is general permission granted by a regulation of the Government of the Republic on the proposal of the Minister of Economic Affairs and Communications to enter into a certain category of agreements, engage in a certain category of concerted practices or adopt a certain category of decisions which complies with the conditions provided for in § 6 of [Competition Act](#) and restricts or may restrict competition

intellectual property laws are planned to be launched in 2014. The Agreement on a Unified Patent Court has been signed by the Government of Estonia, but not yet ratified by the Parliament.

In January 2013, the [Estonian Intellectual Property and Technology Transfer Centre](#) (EIPTTC) was founded. EIPTTC was founded by Estonian Chamber of Commerce and Ministry of Economic Affairs and Communication and its predecessor was Estonian Patent Information Centre. EIPTTC offers a wide variety of intellectual property and technology transfer support services, training and education.

State aid measures classified as aid for innovation clusters are [Cluster Development Programme](#) (2008-2013) and Competence Centre programme (2008-2013). Altogether, 19 cluster projects and 8 competence centres have received funding. In October 2013, the first Social Innovation Incubator (SEIKU), co-financed by Enterprise Estonia, was founded and started action.

In 2012, [Prototyping Centre grants](#) were introduced (administered by Enterprise Estonia). Prototyping Centres in R&D institutions will support developing of a prototype, testing concepts of technologies of services and products.

4.3 Working in partnership to address societal challenges

Estonia as a small country aims to increase the participation of Estonian R&D institutions and innovative enterprises, NGOs and public sector institutions in research, technology and innovation cooperation of the EU framework programmes, and other international programmes as well as in joint infrastructure projects. The main strategic document “Knowledge-based Estonia 2007-2013” defined seven national programme areas: three programmes were selected with a technological focus (ICT, biotech and material technologies) four focused on societal challenges (energy, defence and security, health care and welfare services, environmental protection and technology).

On national level, only the Ministry of Agriculture is participating in the European Innovation Partnership on Agricultural Sustainability and Productivity.

Programme for Internationalisation of Science (introduced in 2011, in Estonian, [“Teaduse rahvusvahelistumine”](#)) aims to support joint activities such as sharing information, joint research agenda, joint calls, joint programming and also developing ex-post evaluation procedures. World level research and co-operation is promoted through the [Centres of Excellence Programme](#).

[Implementation Plan for achieving the objectives of Estonian Research and Development and Innovation Strategy 2007-2013](#) “Knowledge-based Estonia” in 2012-2013 also states that participation of Estonian researchers, R&D institutions and enterprises in international cooperation networks, in the [EU Framework Programmes for research and innovation](#) (incl. the co-financing of the FP6 and FP7, membership fees of international organisations, incl. ESA, etc.) in EUREKA cooperation network, Eurostars programme, and other EU Treaty article 169 programmes, will be supported. Estonia will participate in international joint programmes and infrastructure projects coordinated by science organisations, as well as in international benchmarking. Cooperation opportunities offered by international research organisations (CERN, EMBO, ESA, etc.) will be used.

4.4 Maximising social and territorial cohesion

The preparation of post 2013 Structural Fund programmes with an increased focus on innovation and smart specialisation was performed in hand with the preparation of new RD&I strategy for

2014-2020 (launched in January 2014) and Entrepreneurship growth strategy for 2014-2020 (launched in October 2013).

The RD&I Strategy for 2014-2020 sets four key objectives for Estonia:

- Research in Estonia is of a high level and diverse;
- Research and development (RD) functions in the interests of the Estonian society and economy;
- RD makes the structure of the economy more knowledge-intensive;
- Estonia is active and visible in international RD&I cooperation.

Estonia's research aims to be of high quality and versatile and an attractive place for R&D and another aim is that the career of a researcher be a popular choice. Research and development activities should serve the interests of Estonia's society and economy and Estonia aims to be active and visible in international cooperation in the field of R&D and innovation.

In 2012 and 2013, Estonian Development Fund carried out an analysis on Smart Specialisation. Smart Specialisation **growth areas** (as also defined in the RD&I Strategy 2014-2020) are ICT supporting other sectors, health technologies and services and resource efficiency (see also ch. 2.7). In the "Analysis of deficiencies and new opportunities", general and area specific bottlenecks were found that need to be dealt with in order to increase innovation, and recommendations were given to overcome these obstacles (see table 1).

Table 1. Smart Specialisation: General bottlenecks and proposed measures to overcome these obstacles.

Bottlenecks	Proposed measures
The economic potential in the growth areas is underexploited due to the small volume of R&D investments	Development of Competence Centres open to entrepreneurs, continue financing Competence Centres, supporting applied research in research institutions and universities
Financing to support research intensive start-ups is insufficient	Fund of funds for supporting start-up investments
Increase the emphasis on incubators and seed accelerators	Supporting seed accelerators and incubators
Measures that support R&D activities are fragmented and cooperation between clusters and Competence Centres is inadequate	Establishment and funding of a Growth Area Development and Innovation Centre (GADIC)
Bringing foreign workers to Estonia is difficult	Smart immigration – 'green light' residence permits for specialists who earn at least twice the average Estonian salary or have a doctorate degree
Inadequate international co-operation in R&D	Make GADIC responsible for activities related to international cooperation projects.
The tax environment should be more supportive of innovation	Establishment of a social tax cap, changing the taxation of holding options
Insufficient volume and low quality of natural sciences and engineering education in Estonian basic and secondary schools.	Support the teaching of natural sciences and engineering in secondary school, support natural sciences and engineering hobby groups and innovation groups for students, support online learning environments.
The potential of knowledge-based start-ups has not been adequately used in	Measure: support spinoffs of university research projects, support independent launch of spinoffs

universities	with financial instruments, restructuring and broader support for the Spinno project
Specialists with strong (international) experience do not swap paid employment for the role of entrepreneur	Measure: creation of the 35+ measure (paying an “entrepreneur’s salary” for 12 months) mainly via linking it to the incubator programme and start-up investments.

Source: Estonian Development Fund

4.5 International Scientific Cooperation

Estonia is a very small country and is struggling with attracting talents from Europe. Depending on Estonia’s general economic development, salaries are still 3 times lower than EU average (as are earnings in general), so working in Estonia is not attractive enough to top researchers.

To simplify arrival of foreign students, researchers and top specialists (including third countries) MER has mapped the most relevant limitations resulting from Estonian Aliens Act and other acts and regulations and made relevant proposals to the Ministry of the Interior as well as participated together with representatives of partners in the working group for amending the Aliens Act.

[The Estonian Research Council](#) (founded in 2012) awards [institutional](#) and [personal research funding](#) (relevant amendments to the [Organisation of Research and Development Act](#) in force since 2012). Grant competitions are open to all permanent residents of the Republic of Estonia and to all citizens of a foreign country, if they have full-time job in Estonian R&D institution (residency is not required). Grants should be applied for through an Estonian R&D institution.

Programme for the Internationalisation of Science has broadened the possibilities for Estonian scientists and doctoral students to conduct research abroad, by supporting Estonian participation in implementing EU research policy initiatives. Via Programme Mobilitas, postdoctoral researchers and top researchers have a possibility to apply for a grant to carry out a research in Estonia or abroad.

5 National progress toward realisation of ERA

5.1 More effective national research systems

The main priorities for R&D and innovation policies set down in the RD&I Strategy for 2007-2013 “Knowledge-based Estonia 2007-2013” have been followed (see also ch.2.4).

The RD&I Strategy is supplemented by annually updated implementation plan³⁷ that provides a predictable policy framework for short- and medium-term planning, via annual implementation plans, investment plans, etc.

The share of competitive versus institutional funding in the R&D national budget of the Ministry of Education and Research was 69% and 31% respectively in 2011³⁸. Most of the funding from the budget of the Ministry of Economic Affairs and Communication is competitive.

Since 2001 the public support given to develop the innovation policy has been mainly given as grants. Annual baseline funding was introduced in 2005 and is allocated on the basis of R&D performance indicators of R&D institutions; the same applies to the support to maintenance cost of R&D infrastructures. Allocating competitive funds follows an international peer evaluation of the proposals.

New RD&I Strategy for 2014-2020 (launched in January 2014) is in compliance with the National Reform Programme, “Estonia 2020” strategy and “Entrepreneurship Growth Strategy 2014-2020” (launched in October 2013). In the setting of priorities for RD&I Strategy and Entrepreneurship Growth Strategy, the methodology of Smart Specialisation served as basis. Currently (the first half of 2014), new implementation plans for both strategies are being compiled.

5.2 Optimal transnational co-operation and competition

International cooperation in the technology fields of national importance (ICT, energy, material technology, biotechnology) and on societal challenges (defence and security, health care and welfare services, environmental protection and technology) is a priority for Estonian R&D. The total budget for all programmes (as in the end of 2012) is about €51m³⁹.

Implementation Plan for achieving the objectives of RD&I Strategy⁴⁰ states that as a good practice, international peer-review of large-scale state financed research and development projects, including targeted financing research themes, will be introduced in all research fields in Estonia, whereas evaluations will be carried out in world level comparison of the corresponding field. Field-specific quality criteria will also be taken into account in evaluations.

To carry out regular evaluation of R&D institutions, the Minister of Education and Research shall form a 3-16-member evaluation committee consisting of foreign experts in the various fields and approve its working procedure⁴¹. Involving foreign experts is common rule in evaluating R&D

³⁷ Implementation plans are medium term plans, to align the R&D strategy with the (4-year) budgetary planning

³⁸ [ERAC Peer-Review](#) of the Estonian Research and Innovation System: Steady Progress Towards Knowledge Society (2012)

³⁹ [Report on achieving the objectives and implementing the strategy in 2012](#) (MER, 2013)

⁴⁰ [Implementation Plan for achieving the objectives of Estonian Research and Development and Innovation Strategy 2007-2013 “Knowledge-based Estonia” in 2010-2013](#)

⁴¹ [Detailed conditions and procedure for applying for, conducting and approving the result of regular evaluation of research and development](#) (introduced in 2009, [amendments in 2012](#))

institutions since 1997 and is applied also on personal research funding and institutional research funding (in force since 2012).

Most of joint financing actions are regulated by the 2007-2013 Structural Assistance Act⁴² (and will be regulated in the future by the 2014-2020 Structural Support Act) and by Organisation of Research and Development Act and related acts and procedures, designed for special measures and funds. Regulations for allocating competitive public funds always define priorities, selection criteria and procedures, reporting requirements, eligibility criteria, definition of eligible costs, intellectual property rights, standards for proposal evaluation, funding rates, etc. Joint financing is welcome and project partners are selected based on excellence, not on country of origin. Universities and other R&D institutions are independent and can choose their partners from any country in the world.

The framework document Estonia's European Union Policy 2011-2015⁴³ (launched in 2011) states that Estonia places importance on scientific mobility within sectors and Member States, open and harmonised recruitment conditions, integrated and simple financing rules and procedures, and open access to the R&D results and scientific infrastructures of Member States by the research community of the EU.

The Estonian Research Infrastructures Roadmap 2010 (introduced in 2010, update started in 2013⁴⁴) is a long-term (10-20 years perspective) planning instrument, which lists research infrastructure units of national importance which are either new or in need of modernizing. The roadmap is updated regularly (at an interval of 3 years) to take into account the changing circumstances and opportunities. Allocation of funds for developing infrastructure is described in the Implementation Plan for achieving the objectives of RD&I Strategy⁴⁵. Estonian Research Infrastructures Roadmap 2010 itemises national interest in specific ESFRI projects, but does not deal with rules on access to facilities. Indirectly, mobility programmes provide access also to the infrastructure.

According to the Estonian Research Infrastructures Roadmap 2010, Estonia will participate in the following ESFRI projects: Common Language Resources and Technology Infrastructure (CLARIN); European Social Survey; Biobanking and Biomolecular Resources Research Infrastructure (BBMRI); An Integrated Structural Biology Infrastructure for Europe (INSTRUCT); European Spallation Source.

5.3 An open labour market for researchers

There are no barriers to the application of open, transparent and merit based recruitment of researchers and such principles are applied in the recruitment of researchers of the higher education sector and R&D institutions. The Estonian law stipulates that research staff shall be elected by the research council or by the corresponding body of a legal person in public law or a legal person in private law by way of public competition. Universities and R&D institutions are quite autonomous in their recruitment policies, but the basic rules are set in the Organisation of Research and Development Act and detailed conditions and procedures are established by the ministry or corresponding body of the legal person which governs a R&D institution.

⁴² [2007-2013 Structural Assistance Act](#)

⁴³ [Estonia's European Union Policy 2011-2015](#)

⁴⁴ [Action Plans of Ministries for 2013](#) (in Estonian)

⁴⁵ [Implementation Plan for achieving the objectives of Estonian Research and Development and Innovation Strategy 2007-2013 "Knowledge-based Estonia" in 2012-2013](#)

The Estonian Research Council (formerly the Estonian Science Foundation) adheres to the EUROHORCs Money Follows Researcher Letter of Intent and finances research carried out in foreign institutes after it has been initiated in an Estonian R&D institution.

In 2012, amendments were made to the Organisation of Research and Development Act, to offer Ph.D. students an employment contract with the same social guarantees as any other employment. This will contribute to higher attractiveness doctoral studies.

In 2013, amendments were made to the Aliens Act (adopted in 1993, new version in 2009, last amendments in 2013), in order to amend the procedures for giving work permits with the objective of making it easier for potential top-level specialists and highly qualified employees to enter the Estonian labour market.

Since 2012, the Estonian Research Council has awarded institutional and personal research grants in Estonia. Grants are open to all permanent residents of Estonia and citizens of a foreign country. Grants should be applied through for an Estonian institution.

EUREXESS coordinated information services for mobile researchers in line with the Declaration of Commitment are implemented in the case of Estonia. EURAXESS Estonia has Service Centres in 7 biggest Estonian R&D institutions. The number of requests has risen about 6 times in a year (from 265 in 2011 to 1572 in 2012).

To support the setting up and running of structured innovative doctoral training programmes applying the Principles for Innovative Doctoral Training, programmes and agreements have been in place since 2008-2009, targeting on research excellence, interdisciplinary research options, exposure to industry and other relevant employment sectors, international networking, transferable skills training and quality assurance.

Estonian universities implement the “Charter and Code” principles since 2005. In September 2011, the Rectors’ Conference, representing all public universities and one private university, signed a “Quality Agreement”. Point 10 of the Agreement refers to the implementation of the “Charter & Code”.

5.4 Gender equality and gender mainstreaming in research

The Estonian Government has not introduced specific policies to promote equal opportunities for men and women in the research area. The Gender Equality Act was adopted in 2004 and the latest amendments were made in July 2012.

At the same time, most of indicators show that the situation in Estonia is better than in EU-27 in the average. For the year 2010, throughout the EU-27, on the average 56.1 % of highly educated women in an S&T field were working as professionals or technicians compared with 54.6 % of men. In Estonia, the share of highly educated women in an S&T field who are working as professionals or technicians is 14 percentage points higher than that of men (50.3% of women; 36% of men). The average proportion of female researchers in Estonia was 43% in 2009 (33% in EU-27). In 2010, the proportion of female scientists and engineers in the total labour force was 2% in Estonia (EU-27 was 1.75%) and proportion of men 3% (3.65% in EU-27). In 2009, women represented 46 % of all researchers in the Higher Education Sector in Estonia (40% in EU-27), 61% in the Government Sector (40% in EU-27) and 28% in the Business Enterprise Sector (19% in EU-27). The share of female heads of institutions in the Higher Education Sector in 2010 was 21.2% in Estonia (15.5% in EU-27), but the share of women in scientific and management boards was lower in Estonia (26%) than in EU-27 (36%)⁴⁶.

⁴⁶ [She Figures 2012: Gender in Research and Innovation. European Commission, 2012](#)

5.5 Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

Access to scientific information is not a big problem for Estonian scientists as the Consortium of Estonian Libraries Network and the research libraries have created very good conditions and access to scientific journals and electronic databases for national researchers, which is probably why Estonian researchers do not feel the need for specific open access policies. In addition, the current research funding conditions favour publishing in journals with a high impact, but usually they are not open access journals⁴⁷.

The free access for the results of publicly funded research is stated by amendments (adopted in 2012) of the Organisation of Research and Development Act and measures have been taken to develop a variety of R&D e-infrastructures⁴⁸. A number of measures have been under implementation since 2008-2009 to facilitate the partnerships and productive interactions between research institutions and the private sector (see also ch 4.2). The new Entrepreneurship Growth Strategy 2014-2020 (launched in October 2013) builds on Smart Specialisation and focuses even more on the co-operation between enterprises and R&D institutions.

Electronic identification is widely applied in Estonia, both by the Estonian R&D organisations and the Estonian Research Portal. Remotely accessible services are also widely available. The Programme of Electronic Scientific Information (in Estonian „E-teadusinfo“; launched in 2009) aims to supply Estonian R&D institutions with scientific information and to acquire access to scientific information and electronic publications for Estonian research libraries and organisations.

The Estonian e-repository programme (launched in 2011) is an integrated e-environment created for long-term preservation and availability of digitized resources of the Estonian cultural heritage institutions: libraries, archives, and museums. The e-repository enables to link national heritage collections with the Pan-European library EUROPEANA.

The Estonian Research Information System (ETIS; established in 2006) is developed in a way that would allow it to be used as an open repository, so that the results of research that receive public funding are easily identifiable by appropriate technical means, including through meta-data attached to electronic versions of the research output.

In 2011, Estonian higher education information and communications technology and research and development activities state programme 2011-2015 was launched. It is a cooperation programme between the universities, ICT sector, and the state with the aim to increase the quality of ICT and develop cooperation between different partners.

Estonian Information Technology Foundation for Education (HITSA) was established in April 2013⁴⁹. The mission of HITSA is to provide a high-quality national network infrastructure for Estonia's research, educational and cultural communities. Its services include a permanent Internet connection as well as webhosting, e-mail, consultations in the event of security problems etc.

⁴⁷ European Commission (2011): [National open access and preservation policies in Europe](#): Analysis of a questionnaire to the European Research Area Committee

⁴⁸ [Estonian Research Infrastructures Roadmap 2010](#)

⁴⁹ From May 1st 2013, the Tiger Leap Foundation and the Estonian Education and Research Network (EENet) were transferred to the Estonian Information Technology Foundation and the new name of established organisation will be Information Technology Foundation for Education (HITSA; www.hitsa.ee)

Annex 1. Performance the national and regional research and innovation system

Feature	Assessment	Latest developments
1. Importance of the research and innovation policy	<p>(+) Public action in all relevant policy areas is designed in a strategic, coherent and integrated framework.</p> <p>(-) Synchronised implementation and coordination of policies must be improved</p> <p>(+) Specific programmes are devoted to grand challenges (energy, defence and security, health care and welfare services, environmental protection and technology)</p>	<p>(+) New R&D strategy for 2014-2020 (launched in January 2014) is in compliance with the National Reform Programme, “Estonia 2020” strategy and Entrepreneurship Growth Strategy 2014-2020 (launched in October 2013)</p> <p>(+) Increased R&D budgets are devoted to R&D on grand challenges</p>
2. Design and implementation of research and innovation policies	<p>(+) RD&I strategic objectives and principles of management and financing are set in the RD&I Strategy for 2007-2013 and is supplemented by an implementation plan that provides a predictable policy framework for short- and medium-term planning.</p> <p>(+) An effective and stable centre-of-government structure exists, to ensure properly coordinated implementation.</p> <p>(+) Monitoring and review system is in place, which makes full use of output indicators, international benchmarking and ex-post evaluation tools. Annual reports on achieving the objectives and implementing the strategy.</p> <p>(+) R&D strategy reflects EU priorities, exploits opportunities for joint programming, cross-border co-operation and exploits the leverage effects of EU instruments.</p>	<p>(+) New R&D strategy for 2014-2020 (MER) and Entrepreneurship Growth Strategy 2014-2020 (MEAC) were prepared in co-operation, to avoid unnecessary duplication and fragmentation of efforts.</p> <p>(+) Estonian Research Council (ESC) was established in 2012, which has all R&D and research financing instruments ‘under one roof’ in order to create better synergy and avoid double financing.</p>
3. Innovation policy	<p>(+) The supply side of innovation policy is actively developed and coordinated.</p> <p>(-) The demand side has been weak.</p>	<p>(+) One of three major policy instruments in the “Entrepreneurship Growth Strategy 2014-2020” (launched in October 2013) is “development of demand-side policies”. The state will be an active innovation partner for entrepreneurs as a client for innovative solutions, while fostering the development and procurement of innovative solutions and implementation of demonstration projects.</p>
4. Intensity and predictability of the public investment in research and innovation	<p>(+) Public investments in education, research and innovation is prioritised and budgeted in the framework of multi-annual plans to ensure predictability and long term impact, and drawing on the Structural Funds where appropriate.</p> <p>(+) Measures are in place to stimulate public-private partnerships and to orient researchers toward industrial needs.</p> <p>(-) Estonian R&D policies are heavily inclined towards building the fundamentals of a ‘knowledge-based economy’ in the form of improved higher education and public research and their cooperation with the business sector. Promoting the creation and growth of innovative enterprises and markets and innovation culture have gained less attention.</p>	<p>(+) New R&D strategy for 2014-2020 (MER) and Entrepreneurship Growth Strategy 2014-2020 (MEAC) aim to foster private sector investments.</p>

	(-) No tax incentives for innovation.	
5. Excellence as a key criterion for research and education policy	<p>(+) The research funding is mainly allocated on a competitive basis (ca 70%).</p> <p>(+) Institutes and projects are evaluated on the basis of internationally recognized criteria. The results of the evaluations are used for funding.</p> <p>(+) Grant holders can apply to transfer their research grants only if the institution of the host country has also signed up to the "Money Follows Researcher Letter of Intent".</p> <p>(+) Higher education and research institutes enjoy remarkable autonomy to organise their activities in all areas of education, research, and innovation.</p> <p>(-) Depending on Estonian general economic development, salaries are still 3 times lower than EU average (as are earnings in general), so working in Estonia is not attractive to top researchers.</p>	<p>(+) The Estonian Research Council (founded in 2012) awards institutional and personal research funding (relevant amendments to the Organisation of Research and Development Act in force since 2012). There is still some confusion with these new mechanisms.</p> <p>(+) Amendments to the Organisation of Research and Development Act (2012), to offer Ph.D. students an employment contract with the same social guarantees as any other employment</p> <p>(+) Amendments to the Aliens Act (2013) change current procedures for giving work permits with the objective of making it easier for potential top-level specialists and highly qualified employees to enter the Estonian labour market. The positions have been and are open to all EU citizens.</p>
6. Education and training systems	<p>(+) Policies and goals are set R&D strategy.</p> <p>(+) Estonia is focusing on the enhancement of the quality and efficiency of doctoral studies with a general emphasis on Doctoral Schools and the development of entrepreneurship and economic courses and modules for students of non-business studies in all three university cycles.</p> <p>(-) Low salaries of researchers are one of the main reasons why, despite rapid growth in R&D funding, the number of R&D personnel has not grown sufficiently.</p> <p>(-) High number of people without professional or vocational education remains a challenge.</p>	<p>(+) Higher education funding reform (2012). As a result of the reform the share of state funding will increase. The central idea of the funding reform is to make funding directly dependent on the quality and effectiveness of education, taking into account the society's needs</p> <p>(+) The new Vocational Educational Institutions Act (adapted in 2013) will serve as a legislative basis for important new improvements. All curricula will be made output-based and their linkage with the Estonian qualification framework will be improved. Curricula groups will be accredited by employers and entrepreneurs.</p>
7. Partnerships between higher education institutes, research centres and businesses, at regional, national and international level	<p>(+) Policies and instruments such as innovation/knowledge clusters, knowledge transfer platforms, and voucher systems, are in place to encourage co-operation and knowledge sharing and at creating a more favourable business environment for SMEs.</p> <p>(+) Researchers and innovators are able to move easily between public and private institutes.</p> <p>(+) There are no obstacles to setting up and operating transnational partnerships and collaborations.</p> <p>(-) The whole IP system will be thoroughly examined.</p>	<p>(+) The process of codification of the Intellectual Property Law started in 2012. Updated IP laws are planned to be launched in 2014.</p> <p>(+) Support systems are in place to facilitate knowledge transfer and the creation of university spin-offs and to attract (venture) capital and business angels.</p>
8. Framework conditions promote business investment in R&D, entrepreneurship and innovation	<p>(+) The rules for starting up and running a business are simple and designed from an SME perspective. The legal framework is transparent and up-to-date. Rules are properly enforced. Markets are dynamic and competitive. Willingness to take risks is promoted.</p> <p>(+) Progress has been made since 2008 on venture capital market (Venture capital from the Development Fund from 2008)</p> <p>(-) Policies to promote innovation, entrepreneurship and enhance the quality of the business environment are not yet closely interconnected (Entrepreneurship Growth Strategy 2014-2020 will tackle this problem)</p>	<p>(+) Estonian Business Angels Network (EstBAN) was founded in 2012</p> <p>(+) Estonian government started funding (in 2013) the Baltic Innovation Fund (BIF), committing €20m through respective national agency KredEx. (commitment made in 2012).</p> <p>(+) Programme "Start-up Estonia" for new innovative enterprises (launched in 2011)</p> <p>(+) Business Incubation Programme (2009)</p>
9. Public support to research and innovation in	(+) Enterprise Estonia, which administers R&I support to enterprises, including SMEs.	(+) Funding support to SMEs is basically the same from 2008, changes planned from 2014,

<p>businesses is simple, easy to access, and high quality</p>	<p>There are some support schemes for SMEs only.</p> <p>(+) National funding is allocated through international evaluation procedures and encourages trans-national cooperation. Rules, procedures and time-tables are aligned in order to facilitate participation in EU programmes and co-operation with other Member States.</p> <p>(+) Specific support is available to young innovative companies to help them commercialise ideas rapidly and promote internationalisation.</p> <p>(+) Funding schemes are regularly evaluated and benchmarked against comparable schemes in other countries.</p> <p>(-) Bureaucracy is a problem for SMEs.</p>	<p>to lessen bureaucracy and focus on growth areas (Entrepreneurship growth strategy 2014-2020).</p>
<p>10. The public sector itself is a driver of innovation</p>	<p>(+) Where possible, government-owned data is made freely available as a resource for innovation.</p> <p>(+) The public sector provides incentives to stimulate innovation on ICT within its organisations and in the delivery of public services.</p> <p>(-) No national target has been introduced on public procurement of innovative goods and services.</p>	<p>(+) Government Office of Estonia commissioned qualitative survey “Mapping the public procurement field in order to aid innovative and sustainable public procurements and joint procurements” in 2013.</p> <p>(+) Update of national procurement policy to promote procurement of innovative solutions in order to improve public services, is addressed in the “Entrepreneurship Growth Strategy 2014-2020” (launched in October 2013)</p>

Annex 2. National Progress on Innovation Union commitments

	IU Commitment	Main changes	Brief assessment of progress / achievements
1	Member State Strategies for Researchers' Training and Employment Conditions	(+) Higher education funding reform (2012) (+) Amendments were made to the Aliens Act (2013)	(+) As a result of the reform the share of state funding will increase ⁵⁰ . The central idea of the funding reform is to make funding directly dependent on the quality and effectiveness of education, taking into account the society's needs (+) Amendments to the Aliens Act change current procedures for giving work permits with the objective of making it easier for potential top-level specialists and highly qualified employees to enter the Estonian labour market. The positions have been and are open to all EU citizens. (+)vacancies are announced on the Euraxess portal and the number of requests has risen about 6 times in a year (from 265 in 2011 to 1572 in 2012) (-) Lengthy bureaucracy to access research positions may discourage foreign applicants
4	ERA Framework	(+) Amendments were made to the Aliens Act (2013) (+) Amendments were made to the Organisation of Research and Development Act (2012)	(+) Estonia is promoting researchers mobility (within economic possibilities) and giving work permits for top researchers has been made easier. (+) Access to scientific information is not a big problem for Estonian scientists as Consortium of Estonian Libraries Network has created very good conditions and access to scientific journals and electronic databases for national researchers and results of publicly funded research are available for free. Consortium of Estonian Libraries Network and the purchase of the access to literature and databases is funded directly from MER budget. (+) The research infrastructure roadmap will be updated and launched in 2014. (-) The Gender Equality Act (2004) promotes policies addressing gender balance, but excellence is stronger criteria than gender.
5	Priority European Research Infrastructures	(+) Estonian Research Infrastructure Roadmap was launched in 2010 and will be updated in 2013	(+) According to the Estonian Research Infrastructures Roadmap 2010, Estonia is participating in following ESFRI projects: Common Language Resources and Technology Infrastructure (CLARIN); European Social Survey; Biobanking and

⁵⁰ Estonia 2020 progress report

			Biomolecular Resources Research Infrastructure (BBMRI); An Integrated Structural Biology Infrastructure for Europe (INSTRUCT); European Spallation Source. (+) Foreign researchers have access to Estonian research infrastructure indirectly, via mobility programmes. There is no regulation, but also no restrictions to access as Estonia is interested in raising the number of foreign researchers.
7	SME Involvement	(+) Basically the same from 2008, changes planned from 2014.	(+) Enterprise Estonia, which administers R&I support to enterprises, including SMEs, participates in following programmes: FP7, EUREKA, EUROSTARS, COMPERA, MANUNET, LEAD ERA.
11	Venture Capital Funds	(+) Estonian Business Angels Network (EstBAN) was founded in 2012 (+) Programme "Start-up Estonia" for new innovative enterprises (launched in 2011) (+) Business Incubation Programme (2009) (+) Venture capital from the Development Fund (2008)	(-) No applications for EU Venture Capital funds passports (-) Estonia has simple tax system that does not promote exemptions, so there is no favourable taxation regimes for Venture Capital and/or business angels (+) Business Angels Network is founded. EstBAN is a full member of the European Trade Association for Business Angels, Seed Funds, and other Early Stage Market Players (EBAN) and Estonian Venture Capital Association (EstVCA). EstBAN has close cooperation with the Finnish Business Angels Network (FiBAN). (+) Programme "Start-up Estonia" for new innovative enterprises develops start-up ecosystem in Estonia by knowledge and network development. (+) Business incubation programme gives support via open calls to provide incubation services on contract basis. There is more than 12 incubators in Estonia. (+) Since 2008, Development fund made venture capital investments together with private sector into 18 quick-growth companies with an innovative business model.
13	Review of the State Aid Framework	(+) Cluster Development Programme (2008-2013) (+) Competence Centre programme (2008-2013)	(+) Altogether, 19 cluster projects have received financing. (+) Altogether, 8 competence centres have received funding
14	EU Patent	The Agreement on a Unified Patent Court is signed by the Government of Estonia	The Agreement on a Unified Patent Court is signed by the Government of Estonia, but not yet ratified by the Parliament
15	Screening Regulatory Framework of	(+) ERAC Peer-Review of the Estonian Research and Innovation System: Steady Progress Towards Knowledge Society (2012) (+) Mid-term evaluation of innovation and enterprise support policies was carried out by MEAC in 2012 (+) Innovation study - Evaluation framework for	(+) Several ex-ante or ex-post screening of new or existing regulations regarding their impact on innovation and findings are taken into account while outlining new RD&I strategy and Entrepreneurship Growth Strategy for 2014-2020, and to make amendments to relevant regulations.

		<p>innovation and enterprise support policies in Estonia (2011)</p> <p>(+) The Research and Innovation Policy Monitoring Programme for 2011-2015 (TIPS Programme) was launched in 2011</p> <p>(+) Study “New Opportunities of Estonian Companies – Business Models, Open Innovation, and Options for a State” (2010)</p>	
17	Public Procurement	<p>(+) Government Office of Estonia commissioned qualitative survey “Mapping the public procurement field in order to aid innovative and sustainable public procurements and joint procurements” in 2013.</p>	<p>(-) No national target has been introduced on public procurement of innovative goods and services.</p> <p>(-) No data available on public tenders launched that include innovation criteria</p> <p>(-) No data available on public tenders launched for joint public procurement of innovation</p> <p>(+) Updates of national procurement policy will be addressed in the “Entrepreneurship Growth Strategy 2020” (launched in October 2013)</p>
20	Open Access	<p>(+) Consortium of Estonian Libraries Network</p> <p>(+) Estonian Information Society Strategy 2013 (adopted 2006)</p> <p>(+) Organisation of Research and Development Act (amendments in 2012)</p> <p>(+) Programme of Electronic Scientific Information (in Estonian „E-teadusinfo“; launched in 2009)</p> <p>(+) Estonian e-repository programme (launched in 2011)</p> <p>(+) Estonian Research Information System (ETIS; established in 2006)</p> <p>(+) Estonian Information Technology Foundation for Education (HITSA) was established in April 2013</p>	<p>(+) Consortium of Estonian Libraries Network and the research libraries have created very good conditions and access to scientific journals and electronic databases for national researchers</p> <p>(+) Organisation of Research and Development Act by conditions for institutional and personal research funding (relevant amendments to the act in force since 2012) which state the free access for the results of publicly funded research</p> <p>(+) „E-teadusinfo“ aims to supply Estonian RD&I institutions with scientific information and to acquire access to scientific information and electronic publications for Estonian research libraries and organisations</p> <p>(+) Estonian e-repository programme is an integrated e-environment created for long-term preservation and availability of digitized resources of libraries, archives and museums (enables link to EUROPEANA)</p> <p>(+) Estonian Research Information System is developed in a way that would allow it to be used as an open repository, so that the results of research that receive public funding are easily identifiable by appropriate technical means.</p> <p>(+) Estonian Information Technology Foundation for Education provides high-quality national network infrastructure for Estonia’s research, educational and cultural communities.</p>

21	Knowledge Transfer	<p>(+) RD&I Strategy 2007-2013 “Knowledge-Based Estonia”</p> <p>(+) Estonian Strategy for Competitiveness “Estonia 2020” (launched in 2010)</p> <p>(+) Prototyping Centre grants (2012)</p> <p>(+) Programme ”Start-up Estonia (2011)</p> <p>Following measures are in place since 2008-2009:</p> <p>(+) Cluster development Programme</p> <p>(+) Knowledge and technology transfer baseline funding (SPINNO Programme)</p> <p>(+) Competence Centres Programme</p> <p>(+) R&D project grants</p> <p>(+) Innovation Voucher grant</p> <p>(+) Involvement of innovation staff</p>	<p>(+) Policies and instruments launched to protect the results of publicly funded research;</p> <p>(+) Set up of national knowledge transfer (KT) strategies</p> <p>(+) No new legal and other regulatory barriers to the transfer of knowledge between the public and the private sector</p> <p>(+) New initiative in support of R&D co-operation projects (including KT) between public/academic/non-profit sector research institutions and enterprises (including specific schemes to encourage the business sector to fund research in research institutions).</p> <p>(+) Creation of framework conditions through policies or other measures to incentivise and reward academics engaged in cooperation with industry</p> <p>(+) New 'partnerships' and joint collaborative research agendas signed between the public and private sector</p> <p>(+) Policies and measures that improve recognition and professionalisation of KT activities and that strengthen the role played by knowledge transfer offices (KTO)</p> <p>(+) Newly created public funding schemes used to support the commercialisation of innovative ideas</p> <p>(+) New grant-based support schemes for testing commercialisation potential of research results</p> <p>(+) Policies and funding schemes used to encourage open innovation, co-operation and knowledge sharing and to create a more favourable business environment for SMEs, such as innovation/knowledge clusters, knowledge transfer platforms or voucher systems</p> <p>(+) New financial support schemes directed to enterprises or for services aimed at encouraging technology acquisition (licensing, joint ventures, testing, etc.) and knowledge transfer and other cooperation schemes between enterprises that aims to develop or introduce innovations.</p> <p>(+) New measures or schemes directed at public/private organisations in order to provide or coordinate the provision of specific innovation related services to enterprises (including technology transfer/brokerage, strategic and economic intelligence, manufacturing advisory services, quality and design advice, etc.)</p>
22	European Knowledge Market for Patents and Licensing	<p>(+) The Estonian Intellectual Property and Technology Transfer Centre (EIP TTC) was founded in January 2013</p> <p>(+) Prototyping Centre grants (2012)</p>	<p>(+) The Estonian Intellectual Property and Technology Transfer Centre (EIP TTC) is foundation founded by Estonian Chamber of Commerce and Ministry of Economic Affairs and Communication. EIP TTC predecessor was Estonian Patent Information Centre. EIP TTC offers wide variety of intellectual property and</p>

			technology transfer support services, training and education. (+) Prototyping Centres in R&D institutions to support developing of a prototype, testing concepts of technologies of services and products
23	Safeguarding Intellectual Property Rights	The process of codification of the Intellectual Property Law started in 2012.	The Ministry of Justice established an Expert Group on the Codification of the Intellectual Property Law. The whole IP system will be thoroughly examined. Updated IP laws are planned to be launched in 2014.
24	Structural Funds and Smart Specialisation	(+) Qualitative Analysis of Smart Specialisation“ (2012) and the areas of Smart (+) Smart Specialisation: Analysis of deficiencies and new opportunities (June 2013)	(+) Areas of Smart Specialisation are selected. Findings of surveys will be incorporated into RD&I strategy 2014-2020. The budget for Smart Specialisation in 2014-2020 is planned to be about €140m.
25	Post 2013 Structural Fund Programmes	(+) The draft of 2014-2020 Structural Assistance Act (2013)	The draft of 2014-2020 Structural Assistance Act is ready and in process of harmonization between ministries (Oct 2013)
26	European Social Innovation pilot	(+) Social Innovation Incubator has been founded (2013)	(+) The first Social Innovation Incubator (SEIKU), co-financed by Enterprise Estonia, has been founded and started action in October 2013.
27	Public Sector Innovation	(+)Estonian e-repository programme (launched in 2011) (+) National Science Awards for researchers (+) Wiedemann's Language Award (+) Competitions under the Programme of Science Popularisation: - Estonian Science Popularization Award (2006) - National student research competition (2008) - National research competition for pupils (2008) - National education research competition (2008) - National competition for student inventors (2010) Beside the awards there is also funding of science popularisation activities.	(+)Estonian Research Information System is developed in a way that would allow it to be used as an open repository, so that the results of research that receive public funding are easily identifiable by appropriate technical means. (+) National Science Awards are given (annually) to Estonian researchers and research groups for outstanding achievements in scientific research. Budget for 2012 was €240,000 (8 awards) (+) Wiedemann's Language Award is a national award since 2004 and is given to one person in a year (€32,000) (+) Competitions under Science Popularisation are carried out annually. Budget for 2013 is respectively: - Estonian Science Popularization Award - €21,500 (11 awards) - National student research competition - €61,980 (11 awards) - National research competition for pupils - €11,400 (8 awards) - National education research competition - €4350 (7 awards) - National competition for student inventors -€25,950 (10 awards)
29	European Innovation Partnerships	(+) Agricultural Sustainability and Productivity	(+) Agricultural Sustainability and Productivity (Ministry of Agriculture) (+/-) No national initiatives on Smart Cities and Communities, but one Smart House Competence Centre (with the University of Life Sciences)

			<p>(-) No national initiatives on Water</p> <p>(-) No national initiatives on Raw Materials</p> <p>(-) No national initiatives on Active and Healthy Ageing</p>
30	Integrated Policies to Attract the Best Researchers	<p>(+) Amendments were made to the Aliens Act (2013)</p> <p>(+) Programme for the Internationalisation of Science (launched in 2011)</p> <p>(+) Programme Mobilitas (2008)</p>	<p>(+) MER has mapped most relevant limitations resulting from Estonian Aliens Act and other acts and regulations and made relevant proposals to the Ministry of the Interior as well as participated together with representatives of partners in the working group for amending the Aliens Act to simplify arrival of foreign students, researchers and top specialists (including third countries).</p> <p>(+) Programme for the Internationalisation of Science has broadened the possibilities for Estonian scientists and doctoral students to conduct research abroad, by supporting Estonian participation in implementing EU research policy initiatives</p> <p>(+) Via Programme Mobilitas postdoctoral researchers and top researchers have a possibility to apply for a grant to carry out a research in Estonia or abroad</p> <p>(-) Depending on Estonian general economic development, salaries are still 3 times lower than EU average (as are earnings in general), so working in Estonia is not attractive to top researchers. So, no policies help...</p>
31	Scientific Cooperation with Third Countries	<p>(+) Memoranda with the Russian Humanitarian Scientific Foundation</p> <p>(+) Memoranda with the US Civilian Research and Development Foundation</p> <p>(+) Norwegian-Estonian Research Cooperation Programme for 2009-2014</p> <p>(+) Nordplus Programme</p> <p>(+) Estonian-Latvian co-operation</p>	<p>In addition to the list, given in the left box, Estonia has signed several <u>intergovernmental and inter-ministerial agreements</u>⁵¹ on R&D co-operation.</p>
32	Global Research Infrastructures	<p>Estonia is participating in following ESFRI projects:</p> <p>(+) Common Language Resources and Technology Infrastructure (CLARIN);</p> <p>(+) European Social Survey</p> <p>(+) Biobanking and Biomolecular Resources Research Infrastructure (BBMRI)</p> <p>(+) An Integrated Structural Biology Infrastructure for Europe (INSTRUCT)</p> <p>(+) European Spallation Source</p> <p>(+) Beamline at the MAX IV</p>	<p>(+) According to the Estonian Research Infrastructures Roadmap 2010, Estonia is participating in ESFRI projects, given in the left box. New Roadmap will be approved in the beginning of 2014</p>

⁵¹ Signed by MER: China, Hungary, Czech, Denmark, Latvia, Lithuania, Poland, Ukraine, Azerbaijan; Signed by the Government: Flanders, Belgium, Israel, Greece, Turkey, France, Moldova

		Laboratory in Lund (Sweden)	
33	National Reform Programmes	<p>Reform obligations under the Euro Plus Pact connected to RD&I:</p> <ul style="list-style-type: none"> (+) reform of the management system of the EU funds (+) simplification of the system of entrepreneurship grants <p>Country-specific recommendations “Tailoring of education to labour market requirements”:</p> <ul style="list-style-type: none"> (+) New RD&I strategy for 2014-2020 (launched in January 2014) (+) New Entrepreneurship growth strategy 2014-2020 (launched in 2013) (+) Higher education funding reform 	<p>(+) Modernisation of public administration involves the reform of management and support systems of European Union funds. The main purpose of the reform of the management systems is to pool functions and tasks and to reduce the number of management levels. In addition, it is envisaged to prepare a single implementation plan for a more effective and efficient management of resources of cohesion funds.</p> <p>(+) To promote economic growth and competitiveness, the process of simplifying and better targeting of entrepreneurship grants has been carried out. The renewal of the system of grants and a broader use of financial instruments took place during the planning process for the use of funds under the EU 2014–2020 financing period.</p> <p>(+) Main focuses of both strategies are the areas of growth of smart specialisation, both in the areas of entrepreneurship and research. Joint R&D infrastructure and research projects between different countries are also of importance.</p> <p>(+) The central idea of the funding reform is to make funding directly dependent on the quality and effectiveness of education, taking into account the society's needs. Over the next three years the focus will be on actual implementation of the performance agreements, which significantly contribute to internationalisation of higher education, improving the quality of doctoral studies, reduction of the number of students who discontinue their education, teaching entrepreneurship skills and cooperation with companies.</p>

Annex 3. National progress towards realisation of ERA

ERA Priority	ERA Action code	ERA Action	Recent changes	Assessment of progress in delivering ERA
ERA priority 1: More effective national research systems	MS01	Action 1: Introduce or enhance competitive funding through calls for proposals and institutional assessments	<ul style="list-style-type: none"> • New R&D strategy for 2014-2020 (launched in January 2014) • is in compliance with the National Reform Programme, “Estonia 2020” strategy and “Entrepreneurship Growth Strategy 2014-2020” (launched in October 2013) • Higher education and R&D funding reform (2012) • The Estonian Research Council (founded in 2012) organises evaluation of applications for the institutional research funding and awards via open competitions personal research funding (relevant amendments to the Organisation of Research and Development Act in force since 2012). Personal research funding aims to enhance funding of high-level research and development activities carried out by researchers or small research groups who are employed by a research and development institution. Institutional research funding is provided to aims to ensure the consistency of the research and development of an R&D institution, and to upgrade, supplement and maintain the infrastructure necessary for this purpose. 	<p>(+) The core set of measures to enhance competitive funding through calls for proposals and institutional assessments has been in place for more than 10 years.</p> <p>(+) The central idea of the funding reform in 2012 is to make funding more transparent and directly dependent on the quality and effectiveness of R&D and education, taking into account the society's needs.</p>

ERA priority 2: Optimal transnational co-operation and competition	MS02	Action 2: Ensure that all public bodies responsible for allocating research funds apply the core principles of international peer review	New measures (institutional and personal research funding introduced in 2012) also apply the core principles of international peer-review.	(+) The core set of measures has been in place for more than ten years. International peer-review of large-scale state financed research and development projects, including targeted financing research themes, has been common rule in all research fields in Estonia. for years
	MS06	Action 1: Step up efforts to implement joint research agendas addressing grand challenges, sharing information about activities in agreed priority areas, ensuring that adequate national funding is committed and strategically aligned at European level in these areas	R&D strategy for 2007-2013 stated main goals and the core set of measures in 2007. New R&D strategy launched in January 2014.	(+) International cooperation in the fields of national importance, (ICT, energy, material technology, biotechnology) and on societal challenges (energy, defence and security, health care and welfare services, environmental protection and technology) is a priority for Estonian R&D. The total budget for all programmes (as in the end of 2012) is about €51m.
	MS07	Action 2: Ensure mutual recognition of evaluations that conform to international peer-review standards as a basis for national funding decisions	The core set of rules has been in place for more than ten years.	(-) No mutual recognitions of evaluations. Minister forms the evaluation committee. (+) International peer-review standards are applied as a basis for national funding decisions. Estonian law states that to carry out regular evaluation the Minister of Education and Research shall form a 3-16-member evaluation committee consisting of <i>foreign experts</i> in the various fields and approve its working procedure. Involving foreign experts is common rule in evaluating also personal research funding and institutional research funding (relevant amendments to the Organisation of Research and Development Act in force since 2012). Only regularly evaluated institutions can apply for baseline funding, support for infrastructure and also for competitive funding.
	MS08	Action 3: Remove legal and other barriers to the cross-border interoperability of national programmes to permit	No recent changes.	Estonia has no directly applicable national legislation. (+) Joint financing is welcome and project

		joint financing of actions including cooperation with non-EU countries where relevant		partners are selected by excellence, not by country of origin. Universities and other R&D institutions are independent and can choose their partners from any country in the world. Also world level research and co-operation is promoted through the <i>Centres of Excellence Programme</i> (since 2002).
	MS15	Action 4: Confirm financial commitments for the construction and operation of ESFRI, global, national and regional RIs of pan-European interest, particularly when developing national roadmaps and the next SF programmes	Update of the Estonian Research Infrastructures Roadmap began in 2013 and is planned to be launched in 2014.	(+) Estonian Research Infrastructures Roadmap was introduced in 2010 and includes ESFRI projects. Allocation of funds for developing infrastructure is described in the "Implementation Plan for achieving the objectives of Estonian Research and Development and Innovation Strategy 2007-2013"
	MS16	Action 5: Remove legal and other barriers to cross-border access to RIs	No recent changes.	Estonia has no directly applicable national legislation. Estonian Research Infrastructures Roadmap 2010 itemises national interest in specific ESFRI projects, but does not deal with rules on access to facilities. Indirectly, mobility programmes provide access also to the infrastructure.
ERA priority 3: An open labour market for researchers	MS24	Action 1: Remove legal and other barriers to the application of open, transparent and merit based recruitment of researchers	No recent changes.	(+) There are no barriers to the application of open, transparent and merit based recruitment of researchers and such principles are applied in the recruitment of researchers of the higher education sector
	MS25	Action 2: Remove legal and other barriers which hamper cross-border access to and portability of national grants	Since 2012, the Estonian Research Council has awarded institutional and personal research grants.	(+) Grants are open to all permanent residents of Estonia and citizens of a foreign country. (-) Grants should be applied through an Estonian institution. (+) Since 2005, the Estonian Research Council (formerly the Estonian Science Foundation) adheres to the EUROHORCS Money Follows Researcher Letter of Intent and finances

			research carried out in foreign institutes after it has been initiated in an Estonian R&D institution.
MS26	Action 3: Support implementation of the Declaration of Commitment to provide coordinated personalised information and services to researchers through the pan-European EURAXESS3 network	<p>No recent changes in policies.</p> <p>The number of requests has risen about 6 times in a year (from 265 in 2011 to 1572 in 2012)</p>	<p>(+) Euraxess coordinated information services for mobile researchers in line with the Declaration of Commitment are implemented.</p> <p>There are several EURAXESS national service centres operational and international mobility of researchers - both incoming as well as outgoing - is an important topic emphasized in the national R&D&I strategy, as well as in the national higher education internationalisation strategy. The number of requests has risen about 6 times in a year (from 265 in 2011 to 1572 in 2012)</p>
MS27	Action 4: Support the setting up and running of structured innovative doctoral training programmes applying the Principles for Innovative Doctoral Training.	<ul style="list-style-type: none"> • In 2012, amendments were made to the Organisation of Research and Development Act, to offer Ph.D. students an employment contract with the same social guarantees as any other employment. • Financing model of Doctoral studies was altered starting from 1st January 2012, which gives all 1st year Doctoral students accepted to full-time study at state-commissioned study places, the right to receive Doctoral study grants. From 2013, the right to receive study grants will extend to all 1st year Doctoral students studying full-time and having passed evaluation. 	<p>(+) Programmes and agreements are in place (2008-2009), targeting on research excellence, interdisciplinary research options, exposure to industry and other relevant employment sectors, international networking, transferable skills training and quality assurance.</p> <p>(-) Changes have been made, but the impact is not clear, yet.</p> <p>The lack of stable income and comprehensive social guarantees in Doctoral studies and the possibility to earn higher income outside the university during the years of fast economic growth have attracted many talented Doctoral students to work full-time and in many cases their studies were discontinued during their 3rd-4th year. Doctoral students' study grants have remained the same for years and the sums allocated for salary fund of early-stage researchers are not compatible with expectations of the target group.</p>

	MS28	Action 5: Create an enabling framework for the implementation of the HR Strategy for Researchers incorporating the Charter & Code	In September 2011, the Rectors' Conference, representing all public universities and one private university, signed a "Quality Agreement. Point 10 of the Agreement refers to the implementation of the 'Charter & Code'.	(+) Estonian universities implement charters principles since 2005. (-) Estonia supports the principles of charter, but does not support mandatory use of the charter as it increases administrative burden.
ERA priority 4: Gender equality and gender mainstreaming in research	MS39	Action 1: Create a legal and policy environment and provide incentives	No recent changes on gender equality.	(-) The Estonian Government has not introduced specific gender quotas in support of gender equality either in the public or the private sector. <i>Excellence</i> is the main criterion for researchers to receive funding and to participate in decision-making bodies. (+) Most indicators show that the situation in Estonia is better than in EU-27 in average: the average proportion of female researchers in Estonia was 43% in 2009 (EU-27 33%) and the share of highly educated women in an S&T field who are working as professionals or technicians was 14 percentage points higher than that of men in 2010 (EU-27 1.5%).
	MS40	Action 2: Engage in partnerships with funding agencies, research organisations and universities to foster cultural and institutional change on gender	For funding initiatives on gender equality, the programme "Advancing Gender Equality 2011-2013" was introduced.	(Ongoing programme.)
	MS41	Action 3: Ensure that at least 40% of the under-represented sex participate in committees involved in recruitment/career progression and in establishing and evaluating	No recent changes.	(+) <i>Excellence</i> is the main criterion for researchers to receive funding and to participate in decision-making bodies. (-) Share of under-represented sex on boards designing/ defining national research priorities and policies is 26 % (EU27 is 36%).
ERA priority 5: Optimal circulation, access to and	MS45	Action 1: Define and coordinate their policies on access to and preservation of scientific	The free access for the results of publicly funded research is stated by amendments (adopted in 2012) of the	(+) Access to scientific information is not a problem for Estonian scientists as Consortium of

transfer of scientific knowledge including digital ERA via		information	Organisation of Research and Development Act and measures have been taken to develop variety of R&D e-infrastructures.	Estonian Libraries Network and the research libraries have created very good conditions and access to scientific journals and electronic databases for national researchers, which is probably why Estonian researchers do not feel the need for specific open access policies. In addition, the current research funding conditions favour publishing in journals with a high impact, but usually they are not open access journals.
	MS46	Action 2: Ensure that public research contributes to Open Innovation and foster knowledge transfer between public and private sectors through national knowledge transfer strategies	No recent changes.	(+) The Estonian government has made efforts linking more closely the tertiary education, research and business and there are multiple measures in place focusing on knowledge transfer between public and private sector.
	MS47	Action 3: Harmonise access and usage policies for research and education-related public e-infrastructures and for associated digital research services enabling consortia of different types of public and private partners	In April 2013, Estonian Information Technology Foundation for Education was established (HITSA). In 2011, Estonian higher education information and communications technology and research and development activities state program 2011-2015 (ICT programme) was launched. It is a cooperation program between the universities, ICT sector and the state with the aim to raise the quality of ICT and develop cooperation between different partners.	(+) Estonia does not need specific policies for research and education-related public e-infrastructures etc, as necessary framework and conditions are provided by Estonian Information Society Strategy 2013 and ICT-related regulations suit well to research-related e-infrastructures. (+) Some specific <i>programmes</i> are launched, to respond to some practical needs.
	MS48	Action 4: Adopt and implement national strategies for electronic identity for researchers giving them transnational access to digital research services	No recent changes.	(+) Electronic identification is widely applied in Estonia, both by the Estonian R&D organisations and the Estonian Research Portal. Remotely accessible services are also widely available.

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LIST OF ABBREVIATIONS

BERD	Business Expenditures for Research and Development
CIS	Community Innovation Survey
ECTS	European Credit Transfer and Accumulation System
ERA	European Research Area
ERA-NET	European Research Area Network
ERAC	European Research Area Committee
ESA	European Space Agency
ESF	European Science Foundation
ESFRI	European Strategy Forum on Research Infrastructures
ESS	European Social Survey
EU	European Union
EU-27	European Union including 27 Member States
EUI	European University Institute
FDI	Foreign Direct Investments
FP	Framework Programme
FP7	7th Framework Programme
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
GUF	General University Funds
HE	Higher Education
HEI	Higher education institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
ICT	Information and communications technology
IP	Intellectual Property
IPR	Intellectual Property Rights
IPTS	Institute for Prospective Technological Studies
JRC	Joint Research Centre-Institute for Prospective Technological Studies
MEAC	Ministry of Economic Affairs and Communication (Majandus- ja Kommunikatsiooniministeerium)
MER	Ministry of Education and Research (Haridus- ja Teadusministeerium)

MF	Ministry of Finance (Rahandusministeerium)
MSTI	Main Science and Technology Indicators
PPP	Public Private Partnership
PPS	Purchasing Power Standard
PRO	Public Research Organisations
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
RD&I	Research, Development and Innovation
RI	Research Infrastructures
RTDI	Research Technological Development and Innovation
SF	Structural Funds
SME	Small and Medium Sized Enterprise
S&T	Science and technology
TTU	Tallinn University of Technology (Tallinna Tehnikaülikool)
UT	University of Tartu (Tartu Ülikool)
VC	Venture Capital
WIPO	World Intellectual Property Organisation

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